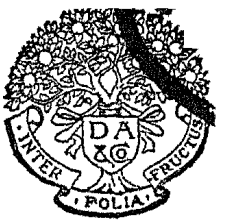
HISTORY OF MANUAL AND INDUSTRIAL SCHOOL EDUCATION

BY

LEWIS FLINT ANDERSON, PH.D.

PROFESSOR OF THE HISTORY OF EDUCATION IN THE OHIO STATE UNIVERSITY



Alles Gescheite ist schon gedacht worden, man muss nur versuchen, es noch einmal zu denken

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PREFACE

From the dawn of history there have been two kinds of education—the education of the manual laborer through practice with tools, implements, and machines in shop, field, ship, or mine, and the education of brain-workers and members of the leisure class in the school, largely with the aid of books.

For centuries these were widely separated and formed, respectively, part of the life experience of quite distinct social or vocational classes. With the development of civilization the manual-labor class come gradually to feel the necessity of both kinds of education, but these remain as different in aims and content and as separate in location as before.

A striking feature of the educational life of the present is the combination of these two hitherto independent kinds of instruction and training. The handwork and training of the laborer has become part of the procedure of the school, hitherto employed almost exclusively in the use of books. On the other hand, systematic instruction according to a logically organized program and involving frequently the use of books has become part of the vocational preparation of the hand worker.

These changes, though made extensively only in recent times, have not, however, been the result of any sudden movement. On the contrary, they have been the

subject of discussion, controversy, and experiment during the last four hundred years.

To present an orderly and connected account of the main outlines of this theorizing and experimentation from its beginning down to the present and to trace out its connection with the industrial education movement of the present is the main purpose of this work.

The work consists of two parts. Part I is devoted to a general survey of the development of manual and industrial education in Europe with incidental accounts of the influence of certain European movements in America. In Part II is given a sketch of the history of industrial education in the United States. The first three chapters of Part I treat successively of the beginnings, the preliminary discussions and proposals and of the actual introduction of educational hand work into the school. In the following chapters the factors which have most powerfully influenced the character or the extension of school education in the industries are taken up successively.

The recent rapid extension of school work in the industries and the increased attention to the professional preparations of teachers of manual and industrial work should create a demand for a knowledge of the rise and development of the industrial education movement as a whole. So far as the writer knows, no book on the subject has been published hitherto in English.

L. F. A.

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CHAPTER I

INDUSTRIAL EDUCATION IN IDEAL COMMONWEALTHS

Summary.—Although sporadic examples of systematic or school education in the industries occur in theory and practice in Greek and Roman antiquity and during the Middle Ages, yet the earliest definite suggestions that it should form part of the general school education of the young date from the Renaissance.

These suggestions are made in the course of descriptions of the presumably exemplary systems of education in ideal states.

In More's *Utopia* every citizen is trained in agriculture and in some other form of skilled labor. Part of the training in agriculture, at least, is obtained in school.

The educational curriculum in Rabelais's *Utopia* consists in part of the study of the more important and interesting industrial and manufacturing processes through direct observation. Certain industrial occupations, the cutting of wood, the bundling of hay, and wood carving are prescribed for purposes of recreation and exercise.

In Campanella's fantastic *City of the Sun* one wall is set aside for the instruction of the inhabitants in the various arts and industries. Furthermore, the ablest artisans are assigned to the task of instructing the citizens in the handicrafts.

Industrial Education in the Earlier Periods

The theory and practice of school education in the industries assumes form in a manner so elusive and by

ways so devious that it is difficult, if not impossible, to locate definitely its origin.

Something resembling school education for cooks [1] and hair-dressers [2] as well as for mechanics and architects [3] may be said to have existed here and there in the ancient world of the Greeks and the Romans. But many students will prefer to consider certain features of medieval monastic life as marking the earliest approximation to industrial school education. Certain medieval writers definitely recognize the mastery of a trade as part of human learning.[4] In the system of monastic education organized by Basil, in the fourth century, not only was instruction given in grammar, rhetoric, and biblical history but certain trades were taught to some of the older children, among others wood work, brass work, weaving, tailoring, architecture, and agriculture.[5] As outposts of a higher civilization the monasteries of northern and western Europe sometimes became centers of the industrial arts and crafts. They were especially serviceable in the protection they afforded to the more artistic crafts. Through them the art of copying and illuminating manuscripts was brought to a high degree of excellence. The arts of the goldsmith and the silversmith were pursued with success. It should be recalled in this connection that even Chaucer's idle and pleasure-loving monk "hadde of gold y-wrought a curious pynne" which

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1 Aristotle, *Politics*, I, 7.

2 Columella, *De Re Rustica*, I, Praef, 5, 6.

3 Lampridius, *Alexander Severus*, p. 44.

4 *E g*, Honorius in Migne, *Patrologia Latina*, Vol. 172, p. 1245, and Hugo of St. Victor, *ibid*, Vol. 176, p 752.

5 Parry, *Education in England in the Middle Ages* (London, 1920), p. 7. Parry cites the *Regulæ Brevius Tractatæ*, xxxviii.

he wore. Dunstan, the famous Abbot of Glastonbury, was an enthusiastic craftsman in metal, wood, and ivory.[6] As Archbishop of Canterbury he imposed upon the secular clergy the duty of learning some handicraft in order that they might train the youth of their parishes in some form of skilled labor.[7]

A definite beginning for the current tradition of the theory and practice of industrial education is to be found, however, neither in antiquity nor in the Middle Ages but rather in the Renaissance, and particularly in the utopias which give expression to the aspirations of that progressive age.

The initiation of the movement for manual and industrial education in schools seems to fall into three fairly distinguishable stages.

The first period is the one just referred to, during which systematic education in agriculture, carpentry, and other forms of manual industry is presented as a feature of life in ideal states, such as the Utopias of More and Rabelais, and Campanella's City of the Sun.

The second period is characterized by attempts on the part of progressive and original thinkers to plan courses or institutions which would afford industrial as well as general education. It is the period in which Petty plans the "Literary Workshop," so similar to the modern industrial high school. It is the period of Cowley's trade school, of Morhof's Scholae Naturae, Artis et Actionum Humanarum, of Becher's mechanical or trade school, of Descartes' technical school for workingmen,

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[6] William of Malmesbury, *Vita St. Dunstani*, IX, 262; W. Stubbs, *Memorials of St. Dunstan*

[7] J. Johnson, *Laws and Canons*, I, 4422; Canon LI, 960 A.D.

and of Comenius' vernacular and Latin schools, in both of which instruction in the industries was to be given.

In the third period, the theorizing of Comenius and other reformers bears fruit in the actual introduction into the school by Francke, Semler, and Hecker of the study of industrial subjects and the practice of the industrial arts.

Industrial Features of the Systems of Ideal States

The attention paid to the industries in the educational schemes of the sixteenth century is probably an outgrowth of the individualism and the "this-worldliness" of the early Renaissance. These tendencies issued in movements for political, social, and religious reform, especially in the countries north of the Alps.

Several of the leading spirits of the Renaissance gave expression to their dissatisfaction with existing political and social conditions and their desire for a more efficient organization of society through the construction of imaginary commonwealths. It is a curious fact that whenever in these a system of education is described the curriculum is found to be more or less industrial in character. In some instances instruction in the industries is introduced for economic reasons; in others the industries are studied as belonging to the realities to which men turned with such relief from the abstractions of the medieval schools; in still other instances the industrial arts seem to have been introduced as a result of a reaction against the narrowness of the older course of study.

More's "Utopia."—The most famous of these descriptions of ideal commonwealths, Sir Thomas More's

Utopia, is the first to suggest the combination of industrial with common school education. Every citizen in Utopia is required to master not only a handicraft but also the art of agriculture. Especial importance is attached to skill in the latter. More informs us that the Utopians "are instructed in it from their childhood, partly by what they learn at school and partly by practice, they being led out often into the fields about the town, where they not only see others at work, but are likewise exercised in it themselves." [8]

The conditions which led More to suggest this provision for the industrial education of the masses are revealed in the context. The opening pages of *Utopia* abound in references to the numerous burdens which oppress the poor—the frequent wars, the idleness and extravagance of the rich, the conversion of corn lands into pasturage, and the lack of adequate provision for such a training of the masses as would enable them to secure a livelihood.[9] That interest in the problems arising from these conditions was quite general in More's time is indicated by the fact that in England the legislation inaugurating the parish apprenticeship system of providing for and training the poor dates from this period.[10]

Industrial Features of Rabelais' System of Education. —The reasons which led Rabelais to give the study of the industries and, to some slight extent, the practice of the industrial arts a place in his system of education

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[8] *Utopia,* Cassell National Library Edition, p. 80.

[10] O Jocelyn Dunlop and Richard D. Denman, *English Apprenticeship and Child Labor,* p. 248.

[9] *Ibid.,* p. 24.

were somewhat different. A true representative of the early Renaissance, he was keenly interested in the industrial occupations as well as in other features of the everyday life about him. It is to gratify this wholesome interest and to extend his pupil's knowledge of his surroundings that Rabelais has him taken

> to see the drawing of metals or the casting of great ordnance; how the lapidaries did work, as also the goldsmiths and cutters of precious stones, . . . to visit the alchymists, money-coiners, upholsterers, weavers, velvet-workers, watchmakers, looking-glass framers, printers, organists and other such kind of artificers.[11]

Another motive was that of leading the pupil to taste something of the rich variety of human experience for which Rabelais and other men of the Renaissance had so keen a relish. It is possibly this motive which accounts for the industrial character of some of the physical exercises recommended. In rainy weather, "they . . . by way of Apotherapie, did recreate themselves in bottling up hay, in cleaving and sawing of wood, and in threshing sheaves of corn at the barn. Then they studied the art of painting and carving."[12]

Rabelais' educational views illustrate the connection between realism and industrialism. Prominent among the realities with which it behooves the student to familiarize himself, whether for purposes of vocational training, general information, or culture, are the industries.

Bacon.—The realistic tendency traceable in the earlier stages of the Renaissance becomes explicit in the writings

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[11] Rabelais, *Life of Gargantua*, Ch. xxiv.
[12] *Ibid.*

of Bacon. The great and enduring structure of scientific knowledge which he plans is to be based upon a firm foundation of carefully observed facts.[13] His views as to the aims of scientific study are, at the same time, decidedly utilitarian in character. Both these facts and the scientific system based upon them are valued primarily as means of improving the condition of human life. "For my part, I . . . try whether I cannot in very fact lay more firmly the foundations and extend more widely the limits of the power and greatness of man."[14]

The influence of these realistic and utilitarian views in promoting the cause of industrial education is not so manifest in the writings of Bacon himself as in those of his disciples, Petty, Dury, Cowley, and others, for Bacon gave little or no attention to the school education of the masses. Salomon's House, however, the ideal institution of learning which he describes in *The New Atlantis*, serves the cause of technical and industrial as well as general education. Among the members of its staff are three "mystery-men," that is, craftsmen who "collect the experiments of all mechanical arts, and also of liberal sciences, and also of practices which are not brought into arts."[15]

Industrial Education in Campanella's "City of the Sun."—The tendencies toward realism and *encyclopædism* which characterize the seventeenth century, and

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[13] Francis Bacon, *Novum Organum* (Ellis and Spedding), Book I, xcviii-cvi.

[14] *Ibid*, I, cxvi.

[15] For illustrations of Bacon's influence on the theory of industrial education in Germany, see Paul J. Marperger, *Trifolium Mercantile Aureum* (Dresden, 1723), p. 329, and Johann B. von Rohr, *Bibliotheca Œconomica*, p. 62.

the influence of these in relating industrial to general education, are illustrated in Campanella's sketch of an ideal commonwealth, *The City of the Sun,* published about 1620. The city is divided by its walls into seven concentric circles. The wall surface is utilized for purposes of public instruction. The course of study is decidedly realistic. Things and not words are studied. Each wall is covered with pictures or specimens or diagrams relating to some one field of learning, such as mathematics, geography, zoology, etc.[16] The sixth wall is assigned to industries. On it are represented all the mechanical arts, with the several instruments for each.

Further provision for industrial education is made through the appointment of the ablest artisans as public teachers of the handicrafts.[17] Regular instruction is supplemented by visits to workshops. Quite in harmony with the realistic and practical character of the course of study is the respect paid in the commonwealth to the industrial arts. The highest rank is accorded to the man who practiced these with the greatest success.[18]

Johann Valentin Andreæ's "Christianopolis."—This series of descriptions of ideal commonwealths proposing school education in the industries may fittingly close

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[16] Henry Morley, *Ideal Commonwealths,* p 223.

[17] *Ibid*, p. 227.

[18] The oft-repeated statement that Luther was an advocate of school education in the industries seems to be erroneous. The passage usually quoted in support of this statement has quite another meaning. Those who quote it seem to ignore the words which I have italicized. "It is my opinion that we should send boys to school for two or three hours a day and have them *learn a trade at home the rest of the time.*"—Luther, "Letter to the Mayors and Aldermen of All the Cities of Germany."

The trade is, clearly, to be learned, not at school, but at home and outside of the boy's school hours.

with the *Christianopolis* of Johann Valentin Andreæ. As the author of *Theophilus* and the friend and inspirer of Comenius, he marks the transition to the second stage in the development of the theory and practice of industrial education. The education provided in *Christianopolis* was in part vocational and industrial. In the chapter entitled "The Nature of Instruction," Andreæ writes:[19]

> The young men have their study periods in the morning, the girls in the afternoon; and matrons as well as learned men are their instructors. . . . The rest of their time is devoted to manual training and domestic art and science, as each one's occupation is assigned according to his natural inclination.

Discussing the work of women in a subsequent chapter he says: "The married women make use of the knowledge which they acquired while in college. For whatsoever human industry accomplishes by working with silk, wool or flax, this is the material for woman's arts and is at her disposal."[20]

In the *Theophilus,* published thirty years later, Andreæ suggests that every school should provide, through different sorts of handwork, for the cultivation of mechanical skill.[21]

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[19] J. V. Andreæ, *Christianopolis,* translation by Dr. F. E. Held (Oxford University Press), p. 210.

[20] *Ibid.,* p. 260.

[21] Dr. Friedrich Heman and Dr. Willy Moog, *Geschichte der neueren Padagogik* (A. W. Zickfeldt), p. 120.

CHAPTER II

INDUSTRIAL EDUCATION IN THE SEVENTEENTH CENTURY

Summary.—While the sixteenth century advocates of industrial education seem to consider the realization of industrial education as a distant, if not unattainable, ideal and hence content themselves with describing it as a feature of life in dreamland, educational leaders of the seventeenth century treat it as a quite practicable measure of educational reform.

The industrial tendencies in the educational thought of the time manifest themselves in the work of Comenius, Becher, Morhof, Descartes, Weigel, Leibnitz, and others on the Continent; in the writings of Hartlib, Petty, Cowley, and Dury in England, and in the educational projects of Hoar, Budd, and Rush in America.

The amount of attention paid during this period to industrial education seems to be due to, or to be a manifestation of, the following:

1. The realistic and utilitarian reaction against the theological and humanistic formalism of the school work of the time. The industrial arts were regarded as affording a valuable preparation for everyday life. The industries were reckoned among the realities a knowledge of which was of essential importance.

2. School education in the industrial arts was considered a means of relieving the poverty and destitution resulting from the devastating wars of the period.

3. Encyclopædists such as Rabelais, Morhof, Becher, Comenius, and others considered technical and industrial subjects as an indispensable part of a complete education.

4. Attempts on the part of the leading rationalists to solve the problem of the curriculum through the aid of the reason

alone, and independently of tradition, resulted in the formulation of courses more or less industrial in character.

5. Under the influence of the realistic and practical tendencies of the times the aristocracy seems to have substituted industrial for some of the older knightly arts as means of recreation. The growing differentiation of upper-class from lower-class education led to the introduction into the latter of industrial subjects for purposes of vocational training.

Comenius as an Advocate of School Education in the Industries

The second period in the history of systematic industrial education is that in which the idea of school education in the industries begins to be treated as a practicable measure of educational and economic reform and not merely as a detail of life in utopia.

One of the earliest to treat the subject in this way was John Amos Comenius. His advocacy of industrial education in schools is one of the most striking features of his *Great Didactic,* a work remarkable for the extent to which it anticipates in the seventeenth the more important educational reforms of the nineteenth and twentieth centuries. He provides for industrial education in three of the four schools which constitute his complete system.

The occupations which he proposes for his "Mother School" anticipate, in some respects, the manual education of the kindergarten. He suggests that children of this age,

> will receive a training in mechanics if they are permitted or are actually taught to employ their hands continually; for instance, to move something from one place to another, to arrange something—to construct something or to pull some-

thing to pieces; to make knots or to undo them, and so forth; the very things that children of this age love to do. As these actions are nothing but the efforts of an active mind to realize itself in mechanical production, they should not be hindered, but rather encouraged and skillfully guided.[1]

In another passage, in which, like Plato,[2] he recommends the utilization of the play activities as a means of industrial education, his ideas closely resemble those which have been carried out in recent times in the "Kitchen Garden." Referring to the advantages that would accrue if useful activities should be employed for purposes of recreation, he suggests that young pupils "be given tools and allowed to imitate the different handicrafts, by playing at farming, at politics, at being soldiers or architects, etc."[3]

These suggested occupations foreshadow the manual and industrial work of the vernacular or elementary school, where the pupils are to "learn the most important principles of the mechanic arts, both that they may not be too ignorant of what goes on in the world about them, and that any special inclination towards things of this kind may assert itself with greater ease later on."[4]

Another benefit to be derived from this study of the principles of the mechanic arts will be that for those who take up the manual occupations "the details of their trades . . . will be to them nothing but . . . the more particular application of the arts with which they are already acquainted."[5]

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[1] J. A Comenius, *The Great Didactic* (London, 1896), Ch. xxviii, Sec 12.

[2] Plato, *Laws*, 643-644.

[3] J A. Comenius, *The Great Didactic*, Ch. xix, Sec. 49.

[4] *Ibid.*, Ch. xxix, Sec. 7.

[5] *Ibid.*, Ch. xxix, Secs 6 and 7.

Something resembling industrial education is vaguely suggested in Comenius' description of the work of the next higher school, the Latin school. Here, under the head of physics, are studied "a part of medicine, of agriculture, and of other mechanical arts."[6]

Manual if not industrial training seems to be provided for in Comenius' plan for a Pansophic School at Saros Patak in Hungary. Here skill

> in action is to be associated with knowledge of things. Without this skill even he who knows much about things will be awkward in dealing with them; . . . No one will be graduated from the institution who is not well trained in those occupations which demand care and circumspection.[7]

The considerations which led Comenius to propose manual and industrial training in schools are not far to seek. The realistic and encyclopædic motives he himself refers to explicitly; children are to study the industries in part "that they may not be too ignorant of what goes on in the world about them."[8] It is noteworthy that this proposal is based also in part on psychological grounds. The active mind of the child, he maintains, tends naturally to express its ideas in visible and tangible form. Its manual occupations "are but the efforts of an active mind to realize itself in mechanical production."[9]

The study of the industries is valued also as affording

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[6] *Ibid*, Ch. xxx, Sec. 2 (viii). For further illustration of Comenius' interest in the study of the industries, see the *Orbis Pictus*, especially Lessons XLIV to XCV, and his *Schola Ludus*, Teil III.

[7] J. A. Comenius, *Scholæ Pansophicæ*, Vol. I, p. 9.

[8] J A Comenius, *The Great Didactic*, Ch. xxix, Sec. 6.

[9] *Ibid.*, Ch. xxviii, Sec. 12.

vocational guidance. The principles of the mechanic arts should be studied in order that "any special inclination towards things of this kind may assert itself with greater ease later on."[10] Moreover, industrial occupations contribute to the maintenance of health.[11] They also cultivate habits of industry and love of work.[12] Comenius is an advocate of industrial education in the schools in part, also, for economic reasons. It is partly in order to train for the business of life that instruction and training in the industries should be given in the school.[13]

In aiming at economic ends, Comenius was quite in accord with the spirit of his times. During no period of history have men manifested a keener appreciation of the material goods of life, or been actuated more exclusively by considerations of the practical and useful, than during the latter half of the seventeenth century. In western Europe this seems to have been due in part to a reaction against the endless and fruitless discussion of theological problems which had dominated intellectual life since the beginning of the Reformation. In Germany it was due in part, also, to the necessity of relieving the misery and destitution consequent upon the devastations of the Thirty Years War.[14]

Becher's Plan for Combining Industrial with General Education

It was largely in the interests of economic reform that Johann Joachim Becher proposed, about 1666, a system

[10] *Ibid.*, Ch. xxix, Sec. 6.
[11] *Ibid*, Ch. xv, Secs. 11-13.
[12] *Ibid*, Ch. xxiii, Sec. 11.
[13] *Ibid.*, Ch. xxix, Sec. 7.
[14] Alfred Heubaum, *Geschichte des deutschen Bildungswesens* (Berlin, 1905), pp. 3-8.

of state schools partly industrial in character. One of these, the Mechanical or Art School, was designed to afford a training preparatory to any of the handicrafts.[15] Supplementary to the school there was to be established a *Theatrum Naturæ et Artis,* a museum of nature and of industry.

Encyclopædism and Industrial Education

The encyclopædic movement of the seventeenth century, a reaction against the narrowness of the traditional school curriculum, was another factor contributing to the growth of the movement for school instruction in the industries.[16] Its representatives advocated the extension of the curriculum through the addition not only of history and the sciences, but also of the industrial arts. Its influence in promoting the correlation of general with industrial training is illustrated in the work of Daniel George Morhof (1639-1691), one of the most eminent polyhistors of his time. He bases his advocacy of an encyclopædic curriculum upon the belief that it is impossible to master any one branch of science without a knowledge of all the others. He maintains, moreover, that it is only a curriculum of this sort which can satisfy man's inborn craving for all knowledge. To impart this knowledge he planned three classes of schools, one for each of the great realms of knowledge, namely, nature, history, and the arts or handicrafts. The art or industrial school is to have a collection of all tools and instruments used by craftsmen and artists.[17]

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[15] *Ibid.*, p. 12.
[16] *Ibid.*, p. 183
[17] *Ibid*, pp 27-29.

The Influence of the Rationalistic Movement

The rationalistic movement of the seventeenth century seems to have created an atmosphere favorable to such striking deviations from traditional educational practice as the introduction of the handicrafts into the general school curriculum or the introduction of school procedure into the training of the artisan.[18] That the great leaders of this movement, Descartes (1596-1654), Leibnitz (1646-1716), and Locke (1632-1704) should also have been friends or active promoters of systematic industrial education can scarcely be ascribed altogether to accident.

Descartes as a Promoter of Industrial Education.— Baillet, who published a biography of Descartes in 1691, states that the latter was

> the first to conceive the idea of opening public courses of instruction for workingmen. According to his plan, large halls were to be erected for the different crafts. Each of these was to contain a museum and a consultation room. In the former were to be kept specimens of all the tools and instruments necessary or useful in the craft. For each of these institutions there was to be appointed a competent instructor, capable of answering the workingmen's questions and of giving them such instruction as would enable them to give a reason for each of the operations which they were daily called upon to put into practice.[19]

Instruction was to be imparted only on holidays and Sundays, when workingmen would have leisure to attend.

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[18] Theobald Ziegler, *Geschichte der Pædagogik* (Munchen, 1904), p. 219.

[19] A. Baillet, "La Vie de M. Descartes," quoted in *Œuvres de Descartes* (Paris, 1898), Vol. XI, p. 659.

Erhard Weigel.—One of the earliest and most eminent of the followers of Descartes in Germany, Erhard Weigel, was an influential advocate of the utilization of handwork as a means of educating the young. In language closely resembling Froebel's[20] he demanded that children should be so directed "that from work itself, from the deed they might learn the beginning of all wisdom, might acquire a knowledge of the actual activity and the working power of God, and thus be led to knowledge not through hearing others speak, but through manual activity."[21]

His influence as an advocate of industrial education is probably to be traced in the work of his pupils, Leibnitz and Semler.[22]

Leibnitz as an Advocate of School Instruction in the Industries.—Leibnitz (1646-1716), another leader in the rationalistic movement, planned to provide for the youth of his time what Descartes had proposed for artisans, namely, a systematic course of technical instruction and training. In his *Plan for the Education of a Prince*,[23] he suggested the establishment of trade schools for that fairly large class of boys who are not fitted by nature for those intellectual pursuits to which the regular schools devoted exclusive attention. There was urgent need, he believed, for such institutions

in order that youths might not be kept back many years uselessly by the floggings of the schoolmaster and to the great injury of the state, which loses as much in practical benefit

[20] For instance, *The Education of Man* (New York, 1903), p. 31.

[21] Quoted in Scherer, *Die Arbeitsschule* (Leipzig, 1912), p. 19.

[22] See below, p. 37.

[23] *Projet de l'education d'un prince* (1693).

as these do in life; for the youths might have been useful, while now their practical skill, instead of having been promoted, has been delayed by just so many years.[24]

Leibnitz' educational writings reflect not only that independence of tradition characteristic of the rationalists, but also the realistic and utilitarian views expressed in the writings of Comenius, Becher, Morhof, Weigel, and other representative writers of the seventeenth century. In his *New Method of Teaching and of Learning Law*,[25] he recommends the study of the handicrafts and of commerce as part of the liberal education of youth between twelve and eighteen years of age.[26]

The Handicrafts in Upper-Class Education

The handicrafts were utilized as means of instruction and training in several of the plans for an improved system of upper-class education in which the seventeenth century was so prolific. The emphasis upon distinctions of social rank which marks this period and the increased demands made upon the aristocracy for the performance of civil as well as military service, created a need for special schools and systems of education that would afford them the requisite practical training. In a fairly large proportion of these plans, not only is vocational training provided for, but the practice of the industrial arts is recommended as a means of promoting health both of body and of mind. Perhaps even more frequently it is recommended as a means of wholesome and profitable recreation.

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[24] Heubaum, *op. cit.*, p. 72.
[25] *Nova Methodus Docendi Discendique Juris.*
[26] Ziegler, *op. cit.*, p. 175.

Locke.—Locke recommends for the English gentleman a training in gardening, woodworking, and other industrial occupations, mainly as a means of recreation, but also as a means of acquiring skill and experience.[27]

> The advantages proposed may be considered of two kinds: 1. Where the skill itself that is got by exercise is worth having. 2. Where the exercise itself, without any other consideration, is necessary or useful for health. . . . For a country gentleman I should propose one or rather both these, viz., gardening or husbandry in general, and working in wood as a carpenter, joiner or turner, . . . by being skilled in one of them he will be able to govern and teach his gardener; by the other, contrive and make a great many things both of delight and use; though these I propose not as the chief end of his labor, but as a temptation to it; diversion from his other more serious thoughts and employments by useful, healthy, manual exercise being what I chiefly aim at in it.

Von Lohney.—Von Lohney, in one of the numerous works of the period treating of the education of the upper classes, refers to the unanimity with which the learned of his time recommend the more cleanly handicrafts as a means of education for the aristocracy. He states further that they are considered as a means of intellectual as well as of physical training.[28]

The Influence of Social Stratification upon the Education of the Laboring Classes

The aristocratic tendencies of the age seem to have favored the introduction of industrial features into the education of the middle and lower classes of society

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[27] John Locke, *Thoughts on Education* (Cambridge, 1902), pp. 177-179.

[28] Georg Engelhard von Löhney, *Hof-, Staat-, und Regierkunst*, col. 31.

as well; here, of course, for vocational purposes rather than as means of recreation. The distinction between classes led naturally to a distinction between the schools which they attended and to an adjustment of the courses in these schools to their respective needs. These needs differed for the most part, however, only in so far as they were vocational. Hence, while schools for the upper classes began to train their pupils for military, civil, and clerical careers, it was felt that the folk schools should afford similar preparation for the more menial and laborious occupations. This view is expressed in the report of the Society of Sciences at Berlin on Semler's *Plan for a Mathematical School of Handwork*, issued sometime toward the beginning of the eighteenth century. It reads:[29]

> Just as the advanced and elementary schools, as well as the academies for the nobility, have been established in order that the young might be trained in them to serve the common weal in ecclesiastical, civil, and military offices, so it is advisable and practicable that those who are to take up a trade and who have hitherto received instruction for the most part only in reading, writing, and arithmetic . . . should in future receive in a certain Mechanical School such training and instruction as is suited to their purposes and future condition in life, in order that their sense and understanding might be developed, and in particular that they might know the different materials and objects . . . and . . . useful instruments and tools, and might utilize this knowledge in a better understanding and practice of their handicraft.

German Interest in Handicraft Training

The combined result of the influences which we have just reviewed was the development in Germany in the

[29] Quoted by Ziegler, *op. cit.*, p. 197.

seventeenth century of a rather extraordinary degree of interest in the handicrafts. Even scholars and men of letters felt impelled to take up the study and the practice of the crafts and industries. Members of the noble and aristocratic classes engaged in the same pursuits. Henry, Duke of Brunswick, is said to have mastered for his own pleasure thirteen different trades. Emphasis was laid upon the value of mechanical skill and knowledge even to those who intended to devote themselves to scientific pursuits. The clearly marked distinction that had always been maintained between the liberal arts on the one hand and the industrial on the other seemed now about to be obliterated.[30]

The Seventeenth Century Movement in England

Meanwhile like conditions had brought about a similar development of interest in trade instruction in England.

In 1641 Comenius visited England upon the urgent invitation of Samuel Hartlib, a philanthropic business man who was extremely active in promoting a variety of social, educational, and other reforms. Hartlib and his friends were interested at the time in a project for the establishment of a Universal College for physical research on the plan of Bacon's "Salomon's House," and believed that they had found in Comenius the man best fitted to direct the affairs of the proposed institution. An eager student of the writings of Comenius, Hartlib had planned also a school for boys in which many of the ideas of the former were to be carried out. This school was the immediate occasion of at least two and possibly three tracts on education written by different

[30] Heubaum, *op. cit.*, p. 8.

members of Hartlib's circle of friends, Milton, Dury, and Petty. In the tracts of the last two, Dury and Petty, more or less attention is paid to industrial training.

Milton's suggestion in his *Tractate* that the student of nature and of mathematics should "procure as often as shall be needful the helpful experiences of hunters, fowlers, fishermen, shepherds, gardeners, apothecaries; and in other sciences, architects, engineers, mariners, anatomists," would hardly justify us in placing him in the list of advocates of industrial education.

Dury.—John Dury, however, a leader in the seventeenth century movement for church unity, proposes a curriculum which provides definitely for technical and industrial, as well as general, education. In his *Seasonable Discourses* he ascribes the current movement for educational reform largely to the influence of Bacon.

> Seeing some such thing as the advancement of learning hath been oftener and in a more public way, at least, mentioned in this nation of late than in former times, partly by the publication of those excellent works of the Lord Verulam . . . we ought not to despair of some good issue at last.

Quite in the Baconian spirit he maintains that the arts and sciences are to be studied with vocational ends in view:

> Of the various arts and sciences: (1) the vulgar should be equipped with those necessary for trades and servile work; (2) the learned for the increase of science and the training up of others; (3) the nobles should be fitted for public charges in peace and war.[31]

[31] John Dury, "Exercitation of Schooling," quoted in Watson, *The Beginnings of the Teaching*, etc. (London, 1909), p. xxvii.

In his *Reformed Schools,* published in 1650, he recommends that special attention be paid to vocational education after the thirteenth or fourteenth year.[32]

William Petty.—Another of Hartlib's friends, William (afterwards Sir William) Petty, had already issued his "Advice to Mr. Samuel Hartlib for the Advancement of Some Particular Parts of Learning." His plan involved the establishment of two educational institutions, the *Ergastulum Literarium,* and industrial school or literary workshop combining in itself certain features both of the modern general school, and of the trade school, and aiming to teach boys "to read and write and earn a living," and the Mechanicum or College of Tradesmen which aimed to do for the trades and industries what Salomon's House was designed by Bacon to do for the sciences.

The *Ergastulum Literarium* was for rich and poor alike. The study of objects and actions was to precede that of reading. Drawing was taught as a means of expression and arithmetic and geometry were to be studied by all. The characteristic feature of the course, however, was the requirement that "all children, even those of highest rank, be taught some gentile manufacture in their minority."

Among the "manufactures" which Petty proposed to have taught in his school were turning, watchmaking, painting, carving, engraving, jewel cutting, and jewel setting, gardening, architecture, shipbuilding, dyeing, and the making of scientific instruments.

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[32] Two hours a day are spent in "husbandry or manufactures or military employment," Adamson, *Pioneers of Modern Education,* p. 143.

In the Mechanicum or College of Tradesmen "one at least of every trade (but the prime and most ingenious workman, the most desirous to improve his art)" was to be allowed a dwelling, rent free, in return for which he was to practice his craft with a view to bringing it to the highest stage of perfection.

Another part of Petty's plan aimed not only at the promotion of the education of craftsmen, but also at affording the young that vocational guidance the importance of which is just now so much discussed. It consisted in the compilation of a complete history or description of all the various arts and manufactures. A similar plan has been proposed in quite recent times.[33] Petty believed that the reading of such a work would not only enable a youth to select an occupation suited to his tastes and capacities, but would afford such instruction in the art as would materially shorten the period of apprenticeship.

> We recommend the completing of a work whose title might justly be *Vellus Aureum sive Facultatum Lucriferarum Descriptio Magna* wherein all the practiced ways of getting a subsistence and whereby men raise their fortunes may be at large declared. . . . Boys might read and hear the history of the faculties expounded, so that before they be bound apprentices to any trade they might learn the good and the bad of it, and not spend seven years in repenting of it and in swimming against the stream of their inclinations.[34]

The benefits to be derived from giving the industrial occupations a place in the curriculum are, in Petty's

[33] See Thomas Twining, *Technical Training*, pp. 241-244.

[34] William Petty, "The Advice of W. P(etty) to Mr. Samuel Hartlib," *American Journal of Education*, Vol. 22, pp. 204-207.

opinion, manifold. Boys will thereby become more industrious. Youths of the upper classes who have had this training will

> be less subject to be cozened by artificers, . . . will certainly bring to pass excellent works, being, as gentlemen, anxious to excel ordinary workmen. . . . The Respublica Artium will be much advanced when such as are rich and able, are also willing to make luciferous experiments. It may engage them to become patrons of the arts. It will keep them from worse occasions of spending their time . . . and will be a great refuge in adversity.

Cowley's Plan of a Philosophical College.—The poet Cowley's *Plan of a Philosophical College,* published in 1661, is still another indication of the practical tendency of the educational thought of the time. This project seems to owe its inspiration to the same source as do Petty's and Dury's and this notwithstanding its author's protestation that "We do not design this after the model of Salomon's House in my Lord Bacon."

The college is to afford instruction in the crafts and manufactures as well as in the other departments of learning. The sixteen professors resident in the institution are to be "bound to study and teach" not only the sciences, but "the mysteries of all trades and improvement of them; the facture of all merchandises."[35]

The Influence in America for Industrial Education

A Proposed Provision for Industrial and Technical Education at Harvard.—The movement in England for greater attention to the sciences and the industries in education seems to have had some influence upon educa-

[35] Barnard's *American Journal of Education,* Vol. 22, p. 209.

tional thought in America. In 1672 President Hoar of Harvard, who during the long period of residence in England had become familiar with the educational views of Comenius, Hartlib, Milton, and Petty, wrote to his friend Boyle that he was planning for his students not only "a large, well-sheltered garden for planting," but also "an Ergasterium for mechanic fancies."[36]

Thomas Budd's Plan for Combining Industrial with General Education.—A more striking example of the influence of these tendencies upon educational thought in America is to be found in the plan of a school for the colonies of Pennsylvania and New Jersey drawn up by an American Quaker, Thomas Budd, in 1685, and published in his pamphlet entitled "Good Order Established in Pennsylvania and New Jersey in America."

His plan provides that "schools be provided in all towns and cities." The curriculum is to include not only the languages and the useful arts and sciences but also various handicrafts. The boys are to be

> taught and instructed in some mystery of trade as the making of mathematical instruments, joynery, turnery, the making of clocks and watches, weaving, shoe-making, or any other useful trade or mystery that the school is capable of teaching; and the girls to be taught and instructed in the spinning of flax and wool, and knitting of gloves and stockings, sewing and making of all sorts of needlework, and the making of straw work, as hats, baskets, etc., or any other useful art or mystery that the school is capable of teaching.[37]

Suggestions are given further as to the place which the industrial arts are to occupy in the daily program.

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[36] Robert Boyle, *Works*, Vol. VI, p. 653.

[37] Thomas Budd, "Good Order Established in Pennsylvania and New Jersey in America," pp. 43-45.

The scholars are to be kept in the morning two hours at reading, writing, and bookkeeping, etc., and other two hours at work in that art, mystery or trade that he or she most delighteth in, and are to have two hours to dine and for recreation and in the afternoon two hours at work at their several employments.[38]

The similarity of this to Petty's plan is apparent. Budd writes, however, as if the idea of combining industrial with general education had been suggested by a work by Andrew Yarenton entitled *England's Improvement by Land and Sea,*[39] in which an account was given of the spinning schools of Germany.

Realistic and Industrial Features of the Courses Planned by Franklin for the Academy at Philadelphia. —These realistic and industrial tendencies again found expression about the middle of the following century when the academy planned by Franklin was opened in Philadelphia. Though Franklin maintained throughout his life a keen interest in the mechanic arts, the structure of society in America was still relatively simple and the need for a more systematic plan of industrial training had not yet become urgent. Nevertheless the practical tendencies of the age as well as his own personal inclinations are reflected in the attention he pays to the adaptation of school education to the needs of the industrial

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[38] *Ibid.*

[39] Part I, published, London, 1677; Part II, 1681. Yarenton (spelled also Yarranton and Yarrington) had been sent to Germany to learn the art of making tin plate, with the end in view of establishing the industry in England. The work contains an account of the author's numerous projects for improving navigation and for establishing or improving various branches of manufacture in England.

classes. In his "Plan for an English School" the third class is to study natural and mechanic history.

For, next to knowledge of duty, this kind of knowledge is certainly the most useful as well as the most entertaining. The merchant may thereby be enabled better to understand many commodities in trade; the handicraftsman to improve his business by new instruments, mixtures and materials; and frequently hints are given for new manufactures or new methods of improving land.

The same emphasis on practical and vocational ends manifests itself in his "Proposals Relating to the Education of the Youth of Pennsylvania." Attention is to be paid to the useful as well as to the ornamental, "regard being had for the several professions for which they [the pupils] are intended." Some practical training in agriculture is recommended as part of the regular curriculum.

While they are reading natural history might not a little gardening, grafting, planting, and inoculating be taught and practiced and now and then excursions be made to the neighboring plantations of the best farmers, their methods observed and reasoned upon for the information of youth, improvement in agriculture being useful to all and skill in it being no disparagement to any?

The work in history is to be correlated with the various industrial and commercial pursuits.

The history of commerce, invention of the arts, rise of manufacture, progress of trade, change of its seats with the reasons and causes, may also be made entertaining to youth and will be useful to all. And this with the account in other histories of the prodigious force and effect of engines and machines used in war, will naturally introduce a desire to be

instructed in mechanics and to be informed of the principles of that art by which weak men perform such wonders, labor is saved and manufactures expedited.

Industrial Training in the Educational System of the Moravian Brethren.—The Moravian Brethren do not seem to have introduced into their schools in this country the industrial training advocated by their coreligionist, Comenius. Dr. Wickersham, indeed, says, referring to an account of the vocational training of their youth at Litiz in Pennsylvania in cabinet-making, shoemaking, weaving and other trades, "Thus it appears that these old Moravian Brethren solved practically more than a century ago the question of industrial education, so much of a puzzle to modern educators."[40] But the training described seems to have been that of the apprenticeship system and not that of the school.

In providing girls in the seminary at Bethlehem with training in knitting, sewing, spinning, and weaving they were doing little more than what other schools for girls were doing at the time.

One suggestion made by Comenius in regard to school training in the industries they do seem to have adopted, namely, that sports and games should be regulated in the interest of vocational training. Dr. Rush refers to this feature of their educational practice:

I would propose that the amusements of our youth at school should consist of such exercises as will be most subservient to their future employments in life. These are: 1, agriculture; 2, the mechanical occupations; and 3, the business of the learned professions. The Moravians at Bethlehem

[40] James P Wickersham, *History of Education in Pennsylvania* (Lancaster, Pa, 1886), p. 155.

in our state have proved that this proposition is not a chimerical one. All the amusements of their children are derived from their performing the subordinate parts of several of the mechanical arts.[41]

Jefferson's Plan for a Trade or Technical School.—Another eminent American of the revolutionary period whose writings reflect the tendencies of seventeenth and eighteenth century educational thought in Europe is Thomas Jefferson. While his great contemporary, Franklin, endeavored to interrelate more closely industrial and general education and to utilize industrial subjects for purposes of liberal culture, Jefferson proposed to systematize and to subject to school methods much of the vocational education of the craftsman. He planned to establish a "school of technical philosophy" as a part of a people's university.

To such a school [were to come] . . . the mariner, carpenter, shipwright, pumpmaker, clockmaker, mechanist, optician, metallurgist, founder, cutler, druggist, brewer, vintner, distiller, dyer, painter, bleacher, soapmaker, etc., . . . to learn as much as shall be necessary to pursue their art understandingly of the sciences of geometry, mechanics, statics, hydrostatics, hydraulics, hydrodynamics, etc.

[41] Benjamin Rush, *Essays, Literary, Moral and Philosophical* (Philadelphia, 1798), p. 59.

CHAPTER III

PIONEER INDUSTRIAL SCHOOLS

Summary.—Notwithstanding the frequent proposals by reformers of the seventeenth century it was not until about the beginning of the eighteenth that handwork was actually given a place in the school program. Francke led the way through introducing wood-turning and other manual occupations as means of recreation into the program of his Pædagogium, a school for boys of the upper classes. A few years later, about 1707, Semler opened in the same city, Halle, a school for apprentices in which he gave instruction in mathematical and other subjects related to the trades pursued by his students. After an interval of three or four decades, during which the subject of industrial education was vigorously discussed, another important beginning was made through the establishment by Hecker, a pupil of Francke, of the Economical-Mathematical Realschule designed to meet the needs of those destined for commercial and industrial pursuits.

Notwithstanding the widespread advocacy of school instruction and training in the industrial occupations throughout the seventeenth century it was not until the beginning of the eighteenth that the idea was actually put into practice.

Francke as a Pioneer of Industrial Education

The initiative seems to have been taken at about the same time by two educational reformers, August Hermann Francke and Christopher Semler, both clergymen and both residents of Halle in Germany.

The former had been educated at the Gotha Gymnasium, a school famous for the exemplification which its curriculum and its procedure afforded of the realistic doctrines both of Comenius and of Ratke and his disciples.[1] The latter, Semler, had been a pupil of Weigel at Jena. The one added tool instruction and training to the ordinary exercises of the Latin grammar school, the other added school instruction in industrial or related subjects to the ordinary shop training of the apprentice.

Francke's pioneer work in giving the industrial occupations a place among the activities of the classical secondary school was carried out in the Pedagogium Regium, a school established by him for the youth of the aristocratic class. The innovation, striking though it was, does not seem to have aroused opposition. Tool and shop work were prescribed not as part of the regular and required work of the school, but as an optional employment for hours of leisure. Its introduction, therefore, simply afforded the boys of this aristocratic school an opportunity of engaging in a form of recreation and physical exercise which had already become quite popular among their elders. Students were permitted outside of the regular study hours both to visit workshops and factories and to practice one or more of the handicrafts. A number of lathes were installed for the use of the students and a master workman was employed to give instruction and training in wood turning. Training

[1] Under Duke Ernest the Pious, that "Prince among educators and educator among princes," and his able coadjutor, Andreas Reyher, the school had been reorganized, and its work brought into harmony with the spirit of the educational doctrines of Ratke and Comenius.

was afforded also in the grinding and polishing of glasses, in engraving on copper, and in other handicrafts.[2]

In his views as to the aims of these industrial studies and occupations Francke manifests the influence of Comenius. They are to serve not merely as a means of recreation and for purposes of bodily exercise but also "to lead the pupil to form correct ideas of all things pertaining to the common weal and to learn their names both in German and in Latin."[3] Other ends proposed are those of habituating the pupil to employ his time in useful ways, of fitting him to make useful discoveries and inventions, and of rendering him generally efficient. Instructors who take their pupils to visit workshops and factories are recommended to read Comenius' *Orbis Pictus,* Weigel's[4] *Abriss der Hauptstände* and other similar works.[5]

Semler and the First Realschule

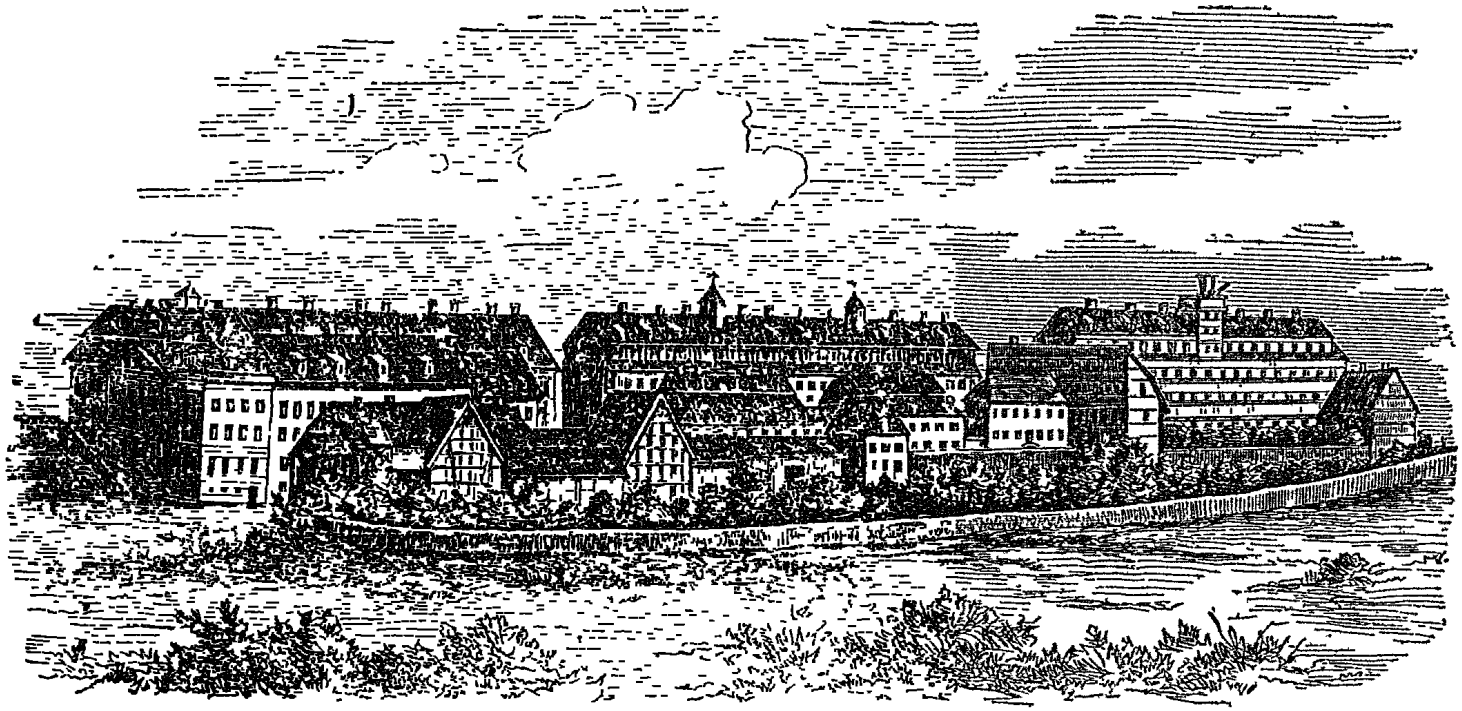
While Francke was thus introducing industrial occupations into the general school curriculum, Christopher Semler, a fellow clergyman, was organizing in the same city a type of industrial school designed to meet the needs of the working classes. As to the extent to which he was influenced by Francke, opinions differ.[6] From his boyhood he had, quite in accord with the

[2] A. H Francke, *Ordnung und Lehr-Art in Pedagogio* (Halle, 1702), p. 16.

[3] *Ibid.* [4] *Ibid.*, p 12

[5] A. H. Francke, *Kurtzer Bericht—der Verfassung des Pædagogii Regii* (Halle, 1720), p. 11.

[6] See Ziegler, *Geschichte der Pædagogik*, pp. 197-198, and Alfred Heubaum in *Neue Jahrbucher für Philologie und Pædagogik* (1893), pp. 65 *ff.*



THE PIONEER INSTITUTION IN PROVIDING SYSTEMATIC MANUAL AND INDUSTRIAL TRAINING.

The Francke Institution as it was about the middle of the eighteenth century. [From Armin Stein (H Nietschmann), *August Hermann Francke* (Halle, a. d. S. Verlag der Buchhandlung des Waisenhauses, 1914)].

tendencies of his time, manifested a keen interest in the study of mechanics. It was his interest in this subject that led him while still a theological student to pursue courses in mathematics and the applied sciences under Weigel, the famous mathematician and educational reformer at the University of Jena. In his work as inspector of city elementary schools at Halle (part of his duty as pastor) he became convinced of their inadequacy to meet the needs of the artisan class. To supply this deficiency he planned a "Mathematical Trade School" for boys who intended to follow some handicraft. His plan was favorably considered by the government officials and was referred both to the city authorities at Halle and to the Society of the Sciences at Berlin.[7]

The report of the latter reveals both the nature of the plan and the influence of the social, economic, and political movements referred to in the last chapter, upon the movement for the industrialization of common school education. The substance of the report is contained in the passage quoted above, page 22. The Society holds that inasmuch as professional school training has been provided for those who are to enter upon civil, ecclesiastical, or military careers, so, special schools should be provided also for those who are to take up a trade.

After waiting in vain for some support from the city or state, Semler undertook in 1708 to carry out his plans himself. He gave instruction twice a week in his own house to twelve boys of the laboring class who were preparing to take up a trade. The work seems to have been practically the same as that outlined in the above-mentioned report.

[7] Ziegler, *op. cit.*, p. 197.

During the following year Semler introduced an important change in that he began to offer instruction in the industrial arts, not only for vocational ends, but as part of a general school education. His plan was extended with this idea in mind, "so that both those boys who intend to devote themselves to study and those destined for the mechanic arts may derive benefit from it." [8]

The close of another year found Semler under the necessity of closing his school owing to lack of support.

Agitation for Industrial Education in Germany Early in the Eighteenth Century

The numerous books and pamphlets on industrial education which appeared during the early decades of the eighteenth century show, however, that the movement had lost none of its vigor. Johann Georg Leib in his work *On the Improvement of Land and People,* published in 1708, urges the establishment of an "Academy of Manufactures." Similarly Chancellor Ludwig of Halle, Johann B. Rohr, and others wrote urging the establishment of mercantile and trade schools in which youths destined for commercial and industrial pursuits might receive special training.[9] Orffyreus' curious plan for "A Great Mathematical, Youth, Virtue, Art, Work and Wisdom School" provides for the boys of the commercial and industrial classes a year of instruction and training exclusively in the arts and handicrafts.[10]

Marperger, the economist, advocates both the intro-

[8] Quoted by Heubaum, *op. cit.*, p. 124.

[9] Heubaum, *op. cit*, p. 184.

[10] *Mitteilungen der Gesellschaft fur deutsche Erziehungs- und Schulgeschichte,* Vol. 13, pp. 171-190.

duction of the industrial arts into the general school curriculum and the organization of systematic trade instruction and training for artisans. He cites the opinions of a number of eminent men who consider a knowledge of the mechanic arts as highly profitable both to the statesman and to the ordinary citizen.[11] A knowledge of the industries, he contends, is not only more useful but more interesting than that of most school subjects.[12] He refers to the fact that such knowledge is quite common among the nobility. If valuable to the laity it is still more valuable to the craftsman. Knowledge of the principles underlying his craft enables a workman to develop it and to make useful inventions.[13] He names the different schools and academies devoted to the promotion of the fine and industrial arts, paying special attention to Semler's Mathematical Trade School described above.

After indicating the various points of superiority of the realistic and industrial subjects over those usually studied in the schools he proceeds to outline his system of work schools. Of these he proposes ten different classes ranging from academies of the fine and mechanical arts and sciences for painters, sculptors, architects, glass polishers, lapidaries, instrument makers, and marine and shipbuilding academies to mechanics' schools for woodworkers, and schools for workers in leather. He then proceeds to describe the organization, the curriculum, and the library, shop, laboratory, and museum, and the equipment of each. He recommends that me-

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[11] Paul Jakob M. Marperger, *Dreifaches Guldenes Klee-Blatt, Von Anrichtung Mechanischer Werk-Schulen* (Dresden u Leipzig, 1723), p. 74. [12] *Ibid.*, p. 78. [13] *Ibid*, p. 96.

chanics meet once or twice a week in their guild houses for instruction by the oldest and most skillful members.

Government regulations issued in Prussia in 1729 and 1733 placed the craft guilds under the supervision of the state and instituted certain reforms in the guild system of apprenticeship.

Semler's Second Realschule.—It was, perhaps, these various indications of a sustained interest in industrial education which encouraged Semler to reopen his Mathematical Trade School in 1738. The school continued in operation, however, only up to the time of his death in 1740.

The Movement for Industrial Education in Germany in the Thirties and the Forties

The agitation for schools which would afford instruction and training in the industries continued unabated throughout the thirties and the forties, and contributed to the establishment by Hecker in 1747 of the first permanent Realschule.

In 1739 Johann Gottfried Gross of Erlangen published a plan for a "Political-Economical Seminary" for the vocational training of youths who did not intend to devote themselves to studious pursuits. In the early forties Georg Heinrich Zincke, Professor of Economics in the University of Leipzig, founded a journal of economics and finance,[14] which championed the views not only of its founder, but of Becher, Marperger, and other advocates of school education in the industries.

[14] *Leipziger Sammlungen von wirtschaftlichen Polizei-, Kammer- und Finanzsachen.*

An anonymous writer in this periodical deplores in 1742 the scarcity of skilled workmen. To remedy this he proposes, first, the establishment of an institution which will seek out youths of unusual talent for industrial pursuits, and, secondly, a school education better adapted to the needs of the craftsman. The ordinary course in the Three R's is to be extended through the addition of such subjects as applied arithmetic, geometry, mechanics, and optics, home and farm management, industrial materials, the history of the industries, and commercial and industrial geography. The writer refers to the beginning made by Semler at Halle, and recommends the establishment of two kinds of industrial schools, one for future craftsmen and one for commercial apprentices.[15]

The Influence of the Movement upon Classical Secondary Schools.—One interesting result of the movement was its influence upon certain of the usually conservative city Latin schools and gymnasia. In 1723 the officials of the city school at Nauen expressed their purpose of paying special attention in the lower classes to the needs of those who did not intend to enter the learned professions. In 1742 the rector of the Kreuz-Schule at Dresden proposed the organization of a special class for those who intended to become craftsmen, artists, or merchants.[16] In the same year the authorities of the Kölnisches Gymnasium at Berlin resolved to pay special

[15] Alfred Heubaum, *Geschichte des deutschen Bildungswesens*, pp. 184-185.

[16] The plan aimed to afford the pupils vocational guidance. "It would enable one," wrote the rector, Christian Schöttgen, "to determine who should become painters, printers, merchants, barbers, druggists, etc." Heubaum, *op. cit.*, p. 187.

attention to the needs of those pupils of the lower classes who did not intend to devote themselves to a life of study.

Other educators, such as Reinbeck of Berlin and Herbart of Oldenberg (the grandfather of Johann Friedrich Herbart), recommended the introduction into the secondary curriculum of geometry and of instruction in the arts and handicrafts for the benefit of all the students.[17]

During this period there was founded the famous Collegium Carolinum, the original purpose of which was to afford a practical education for future agriculturists, foresters, mining experts, and merchants and also to train for military, court, and police service.[18]

Hecker and the First Permanent Realschule

It was apparently the revival of interest in industrial education indicated by the plans and projects just reviewed which furnished the immediate impulse to the establishment by Johann Julius Hecker, in 1747, of the first permanent Realschule.

While still a boy Hecker came under the influence of Johann Heinrich Zopf, Director of the Latin school at Essen and one of the earlier disciples of Francke. On taking up a course in theology at the University of Halle in 1726, he came into direct personal contact with Francke himself. After completing his university course and a year of professional training in Francke's seminary for teachers, he became a teacher in the Pædagogium, where his influence was felt in the development of the courses of study in the sciences. He was called in 1736

[17] Heubaum, *op. cit*, pp. 187-188. These recommendations were made, however, in the interests of liberal rather than vocational education.

[18] Heubaum, *ibid.*, p. 286.

to the directorship of the Potsdam Orphanage, where his work attracted the attention of the king who appointed him pastor of the Church of the Trinity in Berlin. Here he became more and more interested in projects for the better adaptation of school work to the needs of the people, especially those of the burgher class. Under the influence of the movement referred to above, he, like Gross, Zincke, and others, became convinced of the necessity of special schools for those who were to take up industrial occupations. Taking as models such institutions as Semler's Mechanical and Trade School, and the Collegium Carolinum, he founded in 1747 the Economical-Mathematical Realschule.

The aim of the school is stated by Hecker himself in an invitation addressed to patrons at the close of the first year's work. It is "to develop the tendencies of such young people as are not destined for studious pursuits but whose talents would fit them for business, for agriculture, for the industrial and fine arts, etc., and to afford them an introductory training for these pursuits."[19]

A description of Hecker's Realschule by its principal, Johann Friedrich Hähn, reveals still more clearly its vocational and industrial features. In an article published in 1753 on "How the Necessary and the Useful in the Languages, Arts, and Sciences may be combined in the Realschule,"[20] he states that from these, pupils are led with the approval of their parents to select what will

[19] Quoted in Heubaum, *op. cit.*, p 306

[20] Reprinted in Johann G. Biedermann's *Altes und Neues von Schulsachen* (Halle, 1755), VIII.

be necessary for them in their future station in life. Pupils are to be directed earnestly to "subjects useful and helpful to them in their future occupations." Instruction is to be given in the principles of the manufactures and the handicrafts. Special attention is paid to directing pupils to the study

> of things, of realities, especially to the study of such things as will be indispensable to them in their future manner of life. For instance, those who are to become goldsmiths, sculptors, cabinetmakers—will give more attention to drawing than to Greek. Those who are to enter the leather business will receive instruction not only in the different sorts of leather, in their value and use, in the processes involved in their manufacture, but will be allowed to examine some eighty or ninety different kinds.[21]

Thus Hecker's Realschule though it did not aim to make craftsmen of its pupils, did aim, as its founder says,

> through preparatory instruction to make them more efficient in grasping readily and thoroughly the essentials of their future trade, in devising improvements and in applying under varying circumstances what they had learned of science and mathematics in the school.[22]

As a result of attempts to meet the needs of various classes, the organization as well as the curriculum became extremely complex.

The *Agenda Scholastica*, a periodical published by Hecker and Hähn in the interest of the Realschule, reveals the connection between this and earlier movements for realistic and industrial education. One of

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[21] Johann G. Biedermann, *Altes und Neues von Schulsachen*, Vol. VIII, p. 272.

[22] Heubaum, *op cit.*, p. 306.

its features is the amount of space devoted to translations of and commentaries on the educational writings of Comenius.[23]

The Industrial Character of Other Early Realschulen

The Realschulen established elsewhere after the model of Hecker's institution were at first, like the original, decidedly industrial in character. The plan drawn up in 1760 by J. G. Wolf, for instance, for the Realschule at Lörrach, the first to be established in Baden, includes the following statement as to aims: "The Realschule shall be so organized that young people may be trained in from one to one and a half years to become skillful artists, craftsmen and merchants and will need to serve a shorter time than others as apprentices and fellows."[24]

The Influence of Hecker's Work

The connection of Hecker's work with that of Comenius through the work of Francke and Reyher has already been pointed out.[25] Gilow says:

> Francke, following in the footsteps of Comenius, had given careful consideration to the schools connected with the orphan asylum at Halle to the future occupations of the pupils In this and in the attention paid to the extremely useful he was followed by Hecker.[26]

On the other hand the influence of Hecker can be traced on through the eighteenth century in the work

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[23] *Cf.* Heubaum, *op. cit.*, p. 307.

[24] Quoted in *Mitteilungen der Gesellschaft fur deutsche Erziehungs-und Schulgeschichte*, Vol. 14, p. 37.

[25] See pp. 34 and 42.

[26] Hermann Gilow, "Das Berliner Handelsschulwesen," *Monumenta Germaniæ Pædagogica*, Vol. 35, p. 19.

of Felbiger and Kindermann. Felbiger had been a careful student of Hecker's system of practical school education, and copied some of its features in the organization of schools in Silesia and Austria-Hungary. And it was to Felbiger that Kindermann resorted for advice and instruction before he entered upon the task of reforming and industrializing the curricula of the folk schools of Bohemia.[27]

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[27] See p. 80.

CHAPTER IV

NATURALISTIC AND DEMOCRATIC MOTIVES

Summary.—The naturalistic and democratic tendencies of the eighteenth and early nineteenth centuries instill the movement for giving the industries a place in the general education of the young with renewed life and energy. The older arguments for manual and industrial education are supplemented by new ones presented with forceful eloquence in one of the most sensational and widely influential of all works on education. Rousseau's plea is supported by a number of his disciples, themselves ranking among the most eminent educational writers and reformers of the time.

This vigorous advocacy of industrial education results in its incorporation into the programs of various schools, some of which rise into fame as exemplifying the educational activities characteristic of the new age.[1]

Rousseau as an Advocate of Manual and Industrial Education

The influence of the various movements of the sixteenth and seventeenth centuries in promoting school education in the industries, while noteworthy, is yet inconsiderable when compared with that of the revolutionary changes in intellectual, social, political, and in-

[1] *Cf.* Tennyson's characterization of his age

"Now first we stand and understand
And sever false from true
And handle boldly with the hand
And see and make and do"

MECHANOPHILUS

dustrial life which characterize the close of the eighteenth and the greater part of the nineteenth century. The naturalistic and democratic currents of thought of this period (the Industrial Revolution will be reserved for subsequent chapters), and the relation of these to the movement for industrial education are best represented in the writings of Rousseau and his disciples. A new era in the history of the theory and practice of industrial education opens with the publication of Rousseau's *Émile* in 1762. One of the outstanding features of the new and fascinating system of education, so eloquently pictured in that remarkable book, was Émile's training in the workship.

Strangely enough, though Rousseau's fundamental principle, the adjustment of deliberate education to the natural impulses and capacities of the child, has been made the basis of some of the most convincing arguments for manual and industrial training, he himself makes little or no use of it. It is as a democrat rather than as a naturalist that he argues for giving handwork an important place in the educational program. He urges systematic instruction and training in some form of manual industry as a deliberate challenge to the foolish aristocratic prejudices against manual labor: "It is important to learn a trade, less for knowing the trade than for overcoming the prejudices which despise it."[2] Moreover, the accident of birth relieves no one of the obligation of earning a living,[3] and the most natural way

[2] J. J. Rousseau, *Emile* (Everyman's Library, E. P. Dutton & Co), p. 159.

[3] "He who eats in idleness what he himself has not earned is a thief." *Ibid*, p. 158.

of accomplishing this is through learning a trade.[4] Through developing mastery of a handicraft, Rousseau aims to awaken in the pupil that sense of personal dignity and worth which is experienced only by those whose labor entitles them to rank as useful members of society. It is trade education that he is discussing when he writes, "I wish to give him (the young nobleman) a rank which he cannot lose, a rank which will honor him as long as he lives. I wish to raise him to the state of manhood." [5]

But the inculcation of a democratic spirit is not the only benefit that will accrue from industrial training. It is valuable also as a means of cultivating habits of industry, both intellectual and physical. He writes:

> It ought to be plain how, with the habitual exercise of the body and the labor of the hands, I insensibly give to my pupil a taste for reflection and meditation in order to counterbalance in him the indolence which would result from his indifference for the judgment of men and from the repose of his passions. He must work as a peasant and think as a philosopher in order not to be as lazy as a savage.[6]

Further, as is indicated in the passage just quoted, Rousseau values handwork as an aid to intellectual education. Construction makes demands on the intelligence. "If, instead of making a child stick to his books, I employ him in a workshop, his hands work for the development of his mind. While he fancies himself a workman, he is becoming a philosopher." [7]

Various other arguments for constructive handwork

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[4] "Now of all pursuits by which a man may earn a living, the nearest to a state of nature is manual labor." *Ibid.*, p. 158.

[5] *Ibid.* [6] *Ibid*, p. 165. [7] *Ibid.*, p. 140.

are presented by Rousseau. Like Locke, he values it as a form of wholesome exercise and physical training. Referring to the construction by the pupil of the apparatus with which to carry on his scientific investigations, he says, "The most obvious advantage of these slow and laborious enquiries is this: the scholar, while engaged in speculative studies, is actively using his body, gaining suppleness of limb, and training his hands to labor."[8] It is valuable also as a means of recreation. "The great secret of education," he writes, "is to make the exercises of the body and of the mind always serve as a recreation for each other."[9]

Further, he agrees with Locke in recognizing the economic value of industrial training. A trade is a more certain and a more readily available means of making a living than are the more learned professions.

> Instead of resorting for a livelihood to those high knowledges which are required for nourishing the soul and not the body, if you resort, in case of need, to your hands and the use which you have learned to make of them, all difficulties disappear . . . ; you have resources always ready at the moment of need.[10]

The learning of a trade is to be carried on concurrently with the study of the industries. This constitutes, in Rousseau's opinion, the best approach to the study of social relationships.

> When the relationships of knowledge compel you to show him the mutual dependence of men, instead of showing it to him on its moral side, first turn his attention to industry and the mechanic arts which make men useful to one another.

[8] *Ibid.*, p. 139. [9] *Ibid.*, p. 165. [10] *Ibid.*, p. 160.

In conducting him from shop to shop never suffer him to see any labor without putting his hand to the work, nor to go away without perfectly knowing the reason of all that is done there, or at least of all that he has observed.[11]

For purposes of general education, Rousseau anticipates modern educators in preferring, on the whole, work in wood. The practice of this trade, or group of trades, affords all the benefits mentioned in the passages above quoted as derivable from industrial training, and some others as well. "It is clean and useful; it may be carried on at home; it gives enough exercise; it calls for skill and industry, and while fashioning articles for everyday use, there is scope for elegance and taste."[12]

As is indicated above, however, the activities of the pupil are not to be restricted closely to any one trade. He is to have some experience in gardening, and is to be encouraged to try his hand at a variety of other occupations.[13] In this way he will become handy in the use of all the more common tools.

He is ready for anything. He can handle the spade and hoe, he can use the lathe, hammer, plane, and file; he is already familiar with these tools which are common to many trades. He only needs to acquire sufficient skill in the use of any one of them to rival the speed, the familiarity, and the diligence of good workmen.[14]

Rousseau would have the trade learned, of course, in as "natural" a manner as possible. "Shall we have a master of the plane one hour a day, just as we have a dancing master? No. In that case we should be not

[11] *Ibid*, p. 148.
[12] *Ibid.*, p. 163.
[13] *Ibid.*, p. 148 quoted above.
[14] *Ibid.*, p. 162.

apprentices but students, and our ambition is not merely to learn carpentry but to be carpenters." [15]

Once or twice a week the boy is to spend the entire day in the shop of the workman. He is "to work under his orders and . . . after having had the honor to sup at his table," he is to return to his more purely intellectual pursuits.[16] Thus industrial and intellectual education are to be carried on at the same time, more attention being given, however, to the latter, "for we are not only apprenticed workmen, but we are apprenticed men; and our apprenticeship to this last trade is longer and more difficult than the other." [17]

The passage just quoted is noteworthy in that it shows that Rousseau, notwithstanding his vigorous advocacy of industrial training, clearly recognizes its subordinate relationship to general or cultural education.

Industrial Education in the Theory and Practice of the Philanthropinists

The influence of the leading educational writers of the seventeenth and the eighteenth century, and particularly of Locke and Rousseau, in exalting the handicrafts as means and also as ends in education, is illustrated both in the theory and in the practice of the Philanthropinists.

Basedow.—It is clearly manifest in the attention paid to industrial education by their leader, Johann Bernard Basedow, in the organization of the Philanthropinum at Dessau. Like Locke, he favors the utilization of the handicrafts in upper-class education as a means of recreation and as a means of promoting health. Further-

[15] *Ibid.*, p. 164. [16] *Ibid.*, p. 164. [17] *Ibid.*, p. 163.

more, he agrees with Comenius and other realists in classing the industries among the features of the surrounding world, some knowledge of which the child should acquire through direct experience. Again, like Becher, he is inclined to attach special importance to the economic value of knowledge of, and skill in, the handicrafts. In other respects, as will be noted later, he follows the lead of Rousseau.

The utilization of handwork as a means of recreation is recommended in Basedow's *Methodenbuch.*

> Since [he writes] the upper classes are held to no form of handwork at all in their youth, their only resource in hours of leisure is reading and writing. If they weary of this and find no occasion of innocent diversion they rush into follies and extravagances of all sorts.[18]

In the *Elementarwerk,* he recommends that the four vacant hours unprovided for should be devoted by the pupil to the acquisition of experiences that will broaden and intensify his knowledge of human life in civilized society. He is to acquire some skill in the use of the tools of carpenters, smiths, and others which are most frequently needed in making repairs about the house. To extend his knowledge of the various important fields of human activity he is, after some preparatory instruction, to visit the shops of craftsmen. In addition to this, he is, during his sixteenth year, to spend two weeks of each of the four seasons with a peasant, in order to acquire a knowledge of agriculture. At about the same age, he is to spend a fortnight in camp, another at a

[18] J. B. Basedow, *Methodenbuch* (K. F. Koehler, Leipzig, 1913), p. 41.

mine, one at a seaport where there are ships of war, one in the office of a large commercial house, one as a listener in a large city school, one with the chaplain of a large orphan asylum. Finally, a month is to be spent at court.[19] The sixth book of the *Elementarwerk* is devoted exclusively to instruction in the occupations, manual and otherwise, of men in different ranks of society. The text and the accompanying plates give a fairly detailed description of the work of gardeners, builders, shoemakers, tailors, smiths, wagon makers, cabinetmakers, printers, tanners, hat makers, founders, coiners, wire makers, weavers, dyers, turners, and others.

The influence of Rousseau is, perhaps, traceable in Basedow's suggestion that children be taught to make their own toys, and in his further suggestion that through sharing these with each other they be given their first lessons in the study of social relationships.[20]

> What [he says] if a number of boys were to hold frequent meetings and each were to bring for the entertainment of the others what he has learned to make under the instruction and guidance of some craftsman? This would be an excellent illustration of civic coöperation and would afford the instructor frequent occasion for instructing them in the duties of a citizen and in the practical management of affairs.

Basedow's plans for industrial training were carried out in his school, the Philanthropinum. According to the program for 1778, the two upper classes and the class of "famulants" were to receive daily instruction in

[19] J. B. Basedow, *Elementarwerk* (Ernst Wiegandt, Leipzig, 1909), pp. iv, 37.

[20] J. B. Basedow, *Methodenbuch* (K. F. Koehler, Leipzig, 1913), p. 41.

handwork, the former from one to two each afternoon, the latter from two to three. The work was carried on in a room specially fitted up for the purpose with four turning-lathes and three workbenches supplied with all necessary tools for turning and cabinetmaking. Instruction was given by various master craftsmen of Dessau. A report on the work of the students for the above-mentioned year states that

> some of these apprentices can use the chisel, the tongs, the hammer, and saw to good purposes; and a pyramid for decorating a bookcase, a ninepin, a hammer, a rule, a letter cabinet, or a small writing table which they succeed in making gives them more pleasure than the best they can buy.[21]

Salzmann as Promoter of School Education in the Industries.—Similar views as to the value of handwork as a means of education were held by Christian Gotthilf Salzmann (1744-1811), for a time teacher in Basedow's Philanthropinum and later the founder and director of the famous institute at Schnepfenthal. Adopting Rousseau's conception of education as essentially the development of the capacities of the individual, he employed the handicrafts as a means of cultivating manual skill.

> I believe [he writes] that it is essential to good education that children should engage in serious manual labor. . . . For we all have bodily powers; why then should we allow them to deteriorate through lack of exercise? Is not the human hand the most wonderful of tools?[22]

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[21] *Padagogische Unterhandlungen*, Bd. I, pp. 621, 625-632. Photographic reproductions of what may be specimens of the handiwork of the pupils of the philanthropinum are given in Vol 16 of the *Mitteilungen d. Gesellschaft f. Deutsches Erziehungs- und Schulgeschichte*, pp 302-303

[22] Christian G. Salzmann, *Padagogische Schriften* (Wien und Leipzig, 1886), pp. 144-145.

Like Rousseau, he values industrial training as an important aid to mental development. "Can one believe that his mind is capable of giving expression to its manifold powers if its finest instruments, the hands, are allowed to become useless through neglect?" [23]

He urges the cultivation of skill in some form of manual labor, as did Locke and Rousseau, as a resource in times of adversity. "Where is the man of means who can guarantee that he will never find himself in circumstances in which he will have to use his hands? And how deplorable will be his condition when he has need of his hands and they fail him." [24]

Handwork is, moreover, in Salzmann's opinion, an important means of ethical training and is incidentally of value in the maintenance of order in school.

> If the teacher has trained his pupils so that when their lessons are over they can use their hands in carrying out their little plans his problem is solved. He is relieved of the difficult task of entertaining them; they entertain themselves—he is only an onlooker and adviser. The gain to the children is inestimable. In the first place the impulse to activity has been gratified and all wrongdoing into which repressed activity is likely to lead the child has been avoided. Secondly, the children taste one of the purest and truest of all pleasures, that of gradually approaching and finally attaining a preconceived end. . . . The mind which according to the usual methods of education is always drilled in acting according to the prescriptions laid down by others now begins to revive; it forms its own ideas and invents means of carrying them out.[25]

The physical training afforded in Salzmann's institution was differentiated into formal training or gym-

[23] *Ibid.* [24] *Ibid.* [25] *Padagogische Schriften*, p. 558.

nastics and practical training or handwork. While the instructor in charge of the former, Johann Christoph Gutsmuths, became famous as a writer on physical training and as a guide and inspirer of Jahn,[26] the director of practical handwork, Bernhard H. Blasche, was scarcely less influential in promoting the cause of industrial training through his numerous and suggestive writings on the subject.[27]

As the organization of the work in physical training would seem to suggest, more attention was paid to handwork in Salzmann's school than in older institutions of the kind.

> So convinced are we in Schnepfenthal [writes Salzmann] of the necessity and the importance of the training of the hand and the use of tools that we afford every opportunity for work of this kind. Hence every room occupied by pupils for any length of time is provided, where circumstances permit, with a workshop where are to be found a bench, plane, chisel, hammer, file, and other tools.[28]

Not only wood carving and cabinetmaking, but work in pasteboard, basket making, lacquer work and gardening were carried on.

The industrial training, Salzmann believed, should be given, not by a workingman but by a professional

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[26] Friedrich Ludwig Jahn (1778-1852), the father of the patriotic movement for gymnastic training which aroused so much enthusiasm in Germany and which influenced educational thought and practice in England and the United States in the third and fourth decades of the nineteenth century.

[27] *Der Papparbeiter* (1797); *Werkstatte der Kinder* (1800-1802); *Grundsatze der Jugendbildung durch Industrie* (1804); *Sammlung neuer Muster von Papparbeiten* (1809); *Ein paar Worte an Eltern* (1811); *Der Papierformer* (1819).

[28] *Ueber die Erziehungsanstalt*, p. 46.

teacher. Hence he urges the incorporation of industrial training into the professional preparation of teachers. He would have the prospective teacher acquire skill not only in paper-folding, knitting, and gardening, but also in the use of the commoner tools—the plane, chisel, brace and bit, saw and hammer.[29]

Campe.—The tendency of the Philanthropinists as a whole to give handwork a place in the regular program of the general school is further illustrated in the reforms advocated by J. H. Campe (1746-1818), the ablest and the most popular writer of the group. Like Salzmann, he was for a time connected with the Philanthropinum at Dessau; like him, too, he later established a school of his own, which he conducted with marked success. Raised to the rank of School Councilor by his friend and patron, the Duke of Brunswick, he devoted himself as a writer and publisher to the promotion of educational and other reforms. In two pamphlets addressed to Frederick William II of Prussia upon his accession, he urges as the first of several proposed means of promoting public welfare the introduction of trade instruction and training into the folk schools. Ungraded and with only one teacher, these schools, he contended, by leaving the pupils so largely to their own resources, were actually instilling into them habits of idleness and of corrupt conduct. To counteract this, he proposes the addition to each school of a teacher of the handicrafts, who should provide industrial training for successive groups of pupils during the periods when they were not kept employed by the regular teacher. In this way, he contended, wholesome and gratifying exercises would be

[29] *Padagogische Schriften*, pp. 582-583.

afforded the pupils' impulse to activity, and, instead of evil habits, habits of industry and of efficient workmanship would be cultivated.[30]

Bernhard H. Blasche (1765-1832).—Notwithstanding the amount of attention paid to the manual and industrial arts by the Philanthropinists, they occupied a place of minor importance in their school programs. Even in Salzmann's school, handwork ranked only as "a supplementary occupation" and was carried on only outside of school hours. Among those to dissent from this and to claim for the practice of the industrial arts a place of central importance among the activities of the school was Bernhard H. Blasche,[31] director of handwork in Salzmann's institute at Schnepfenthal from 1796 to 1810.

In his four-volume work entitled *Workshops for Children,* he attempts to work out a complete list of the manual occupations eligible for purposes of general education and to correlate these with the other school subjects. His long list includes such exercises as the following: the care of pets and other domestic animals; the making of traps, snares, and nets; the collecting of butterflies and other insects. The foregoing are considered suitable for young children because of their love for animals. As winter occupations, he recommends the putting together of toy tables, chairs and other furniture, the arranging of colored plugs in holes, the making of garlands and chains, and the drawing of patterns for pasteboard receptacles. Older children construct models

[30] J. Leyser, *Joachim Heinrich Campe* (Braunschweig, 1877), Vol. I, pp. 354-358

[31] B. H. Blasche, *Werkstatte der Kinder,* Zweiter Teil, Vorrede, v-vi; Perthes.

of workshops of the different trades. They mold forms in clay, plaster of Paris, or wax. Among the other employments for intermediate and older children, are exercises in the use of tools, gilding, papier-mâché work, the making of apparatus, the removal of spots and stains, taxidermy, wire work, and basket work.

The benefits to be derived from efficient instruction in the industries include the development not only of the impulse to activity and of physical capacity and skill, but also of receptivity for scientific instruction.[32]

J. H. G. Heusinger (1776-1837).—Similar emphasis is laid upon manual activity as a factor in education by J. H. G. Heusinger in the general course of study outlined by him in *Die Familie Werthheim,* published 1798-1809. The work includes an elaborate presentation of arguments in support of the utilization of handwork as one of the most important means of education. It reflects the influence of both Rousseau and Basedow.

A characteristic feature of Heusinger's educational writings is his elaborate presentation of psychological reasons for basing general education largely upon manual and industrial activities. On this account a fuller discussion of his work is deferred to another chapter.

Pestalozzi (1746-1827).—Among the most influential of those who applied naturalistic principles in actual school education was Pestalozzi. To him, as to Rousseau, education was essentially a matter of the development of the native powers of the child. This development was to be brought about naturally through interaction with environment, that is, largely through the performance

[32] B. H. Blasche, *Werkstätte der Kinder,* II, Vorrede, xii-xiii; Perthes.

of duties peculiar to the individual's station in life. This principle, applied to the education of the poor, reinforced other reasons, economical, ethical, and otherwise (to be discussed elsewhere) [33] for making it largely industrial.

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[33] See pp. 85-87.

CHAPTER V

THE INDUSTRIAL REVOLUTION I

Summary.—The great change in industrial life, known as the Industrial Revolution, issued in two distinct movements for industrial education. The earlier of these dates from the last years of the eighteenth century and aimed primarily at aiding the workman to adjust himself to the new conditions through the study in childhood or in adult life, of the industries or of the subjects related to them. The later movement (described in Chapter VIII) got under way only in the second quarter of the nineteenth century and aimed at aiding the country in the international struggle, intensified by the Industrial Revolution, for the markets of the world.

The English educational reformers of the early period of the Industrial Revolution, Bell, Lancaster, and Owen recognized the value of the industrial training as a feature of the education of the poor. It is a prominent feature of Bell's school at Swanage and of Owen's at New Harmony, Indiana. Lancaster, though he was unable, through lack of funds, to introduce it into his monitorial school, nevertheless clearly appreciated its importance as a means of meeting conditions created by the Industrial Revolution.

The substitution of machine for handwork and the progressive division of labor tended to deprive the industrial activities of much of their educational value. Attempts were made to counteract this evil through the education of adult workmen in the sciences most closely related to their daily occupations. This was one end for which mechanics' institutes, lyceums, and other associations for mutual improvement were organized.

In order to revive the workingman's interest in his work and to make it intellectually stimulating, and in order to afford both craftsmen and laymen scope for originality of thought, for self-expression, for the cultivation of taste and of pride in workmanship, the restoration of hand methods of manufacture was proposed and attempted by Ruskin, Morris, and other pioneers in the arts and crafts movement. This movement has exercised some influence on the aims and character of industrial education in the common schools.

The gradual decline of apprenticeship under the influence of the Industrial Revolution has ever since been one of the most influential of the factors contributing to the movement for school education in the industries.

The Influence of the Industrial Revolution

The history of industrial education in England, as affected by the Industrial Revolution, falls into two fairly distinct stages. During the earlier, provision for industrial and other training and instruction is made primarily as a means of enabling the working classes to adjust themselves to the often oppressive conditions imposed upon them by the new system of manufacture.[1] The initiative in this movement is taken, as a rule, by philanthropists or by the workingmen themselves.

The later stage is marked by the development, from the third or fourth decade of the nineteenth century on, of an additional and much more powerful motive for providing industrial education, namely, that of enabling England to maintain herself in the ever-increasing struggle among the industrial nations for the markets of the

[1] F. Ware, *Educational Foundations of Trade and Industry* (New York, 1901), pp. 17-18

world. Its course will be traced in a subsequent chapter.[2]

The Philanthropic Movement for School Education in the Industries

The direct influence of the earlier, philanthropic movement on educational practice was relatively slight. Its leaders and organizers recognized almost without exception, however, the value of school education in the industries, and some of these, through their speeches and writings, made not unimportant contributions to the progress of the industrial education movement. For this reason their work deserves some attention. Their failure to include the industrial occupations among the activities of the Sunday schools, monitorial schools, and infant schools, seems to have been due mainly to lack of financial support and to the obstacles presented by the character of these institutions themselves.

Views and Activities of Leaders of School Movements

The establishment by Mrs. Trimmer, the prolific eighteenth century writer on education, of a Sunday school at Brentwood in 1786, and the later provision for the training of its pupils in spinning, led to the multiplication of "Schools of Industry" for the poor.[3]

Lancaster seems to have been desirous of providing industrial training in his monitorial schools. In his account of his plan for the training of monitors, he says: "If the Subscription proves sufficiently liberal, they will be qualified to teach some work of Industry; as

[2] See Ch. viii.

[3] *Cf.* John W. Adamson, *A Short History of Education* (Cambridge, 1919), pp. 233-234.

Shoe-making, Tayloring, Basket-making, etc., to the Children whom they may have under their care."[4] In a subsequent reference to his plans, he says, "I hope to see, before another twelvemonth, the boys habituated to industry, making their own shoes, and clothing of every description."[5]

He quotes with approval the views of his friend, William Corson, as to the importance of the industrial education of the poor as a means of remedying conditions brought about by the Industrial Revolution.

> The invention and improvement of machinery has now nearly put an end to spinning by hand. . . . Whether we consider the general good of society, the welfare of the poor or the interest of those who maintain them, we must feel equally impressed with the important duty of affording the rising generation the means of acquiring an honest livelihood. How pleasing—would it prove—to see established a thousand village schools with this inscription: "To the Glory of God and the Benefit of Poor Children; the Village School for Industry and Instruction."[6]

Andrew Bell, Lancaster's rival in the promotion of the monitorial system of schools, organized a school at Swanage almost wholly on the industrial plan, the manufacture of straw plait being the chief occupation.[7]

Robert Owen, although he does not provide industrial training for the extremely young children of his infant schools, nevertheless recommends it for children of eight and over. He proposes that at this age they should "begin to devote some hours every day to acquire a

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[4] Joseph Lancaster, *Improvements in Education* (London, 1805), p. 26 [5] *Ibid.*, p. 210. [6] *Ibid*, p 126

[7] Robert Southey, *Life of Dr. Bell*, Vol. II, pp. 107-111, 117 and 202.

knowledge of the principles and the practice of some of the useful arts of life."[8]

One of the striking features of the schools established by Owen and Maclure at New Harmony was the amount of attention paid to industrial training.[9]

Adam Smith

Already, in the latter half of the eighteenth century, the great economist, Adam Smith, had pointed out the harmful influence which the minute division of labor, one of the characteristic features of the factory system, was exerting on the mental and moral character of the workingman. To counteract this, he urged increased attention in the school education of the young, if not to the industrial arts, at least to the sciences most closely related to their future industrial occupations.

> If in those little schools they were instructed in the elementary parts of geometry and mechanics, the literary education of this rank of people would perhaps be as complete as it can be. There is scarce a common trade which does not afford some opportunities of applying to it the principles of geometry and mechanics, and which would not, therefore, gradually exercise and improve the common people in those principles, the necessary introduction to the most sublime as well as to the most useful sciences.[10]

Adult Education in the Sciences Related to the Industries

The above recommendation, though not adopted in any general system of school education for the young,

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[8] *New Harmony Gazette*, August 16, 1826, p. 373.

[9] *Cf.* Will S. Monroe, *Pestalozzian Movement in the United States*, p. 113.

[10] *The Wealth of Nations*, Book V, Ch. i.

was applied in practice in a number of educational institutions for adult workingmen, which were largely a product of the conditions brought about by the Industrial Revolution.

George Birkbeck.—The earliest important attempt to restore to the daily labor of the workingman, through systematic instruction in the related sciences, something of the interest and of the educational value which it had lost under the factory system, was made by George Birkbeck at Glasgow in 1800. While occupying the Chair of Physics at the Andersonian College, he conceived the plan of delivering a course of lectures in that subject to workingmen. A similar course had been given earlier by John Anderson, the founder of the institution, while professor in the University of Glasgow, but the cost of tuition and the hours at which the lectures were delivered had rendered them available to only a few of the laboring class.[11] Birkbeck's lectures were less expensive and more popular in character. The prospectus shows that they constituted, in part, a deliberate attempt to make the manufacturing process more significant and interesting to the workingmen through affording them instruction in the scientific principles exemplified in their everyday work.[12] It reads:

I shall deliver a series of lectures upon the mechanical properties of solid and fluid bodies, abounding with experiments and conducted with the greatest simplicity of expression and familiarity of illustration, solely for persons engaged in the practical exercise of the mechanical arts. . . . I have become convinced that much pleasure would be com-

[11] A. H. Sexton, *The First Technical College* (London, 1894).

[12] *Cf.* John Dewey, *Democracy and Education* (New York, 1916), p. 367.

municated to the mechanic in the exercise of his art, and the mental vacancy which follows a cessation from bodily toil would often be agreeably occupied by a few systematic philosophical ideas, upon which at his leisure he might meditate. Greater satisfaction in the use of machinery must be experienced when the uses to which it may be applied and the principles upon which it operates are well understood than when the manual art alone is known, the artist remaining ignorant of everything besides.

But the efforts of Birkbeck and other leaders would probably have availed little had they not been supported by the more intelligent among the workingmen themselves. The wonder-working machinery of the new factories, and the increasing application of scientific discoveries to processes of manufacture, aroused in the more progressive workingmen a desire for scientific information and technical skill, that expressed itself in the formation of various "mutual improvement societies."[13] In 1817, Timothy Claxton of London formed, with a few fellow artisans, a society "The Mechanical Institution," which met once a week in different places for the discussion of topics related to the arts and sciences. Claxton later removed to America, where he continued active in the promotion of similar organizations for workingmen.[14]

The Mechanics' Institute.—The vigorous growth of the movement just mentioned led to the establishment in 1823 of the *Mechanics' Magazine*, the aim of which was to afford instruction in "the history and principles of

[13] Michael Sadler, *Continuation Schools in England and Elsewhere*, pp. 3-4

[14] Henry Barnard, *American Journal of Education*, Vol. 8, p. 253.

the mechanic arts and information as to inventions and improvements."

A proposal in one of the earlier numbers of this periodical for the establishment of a London institution for the education of mechanics met with a hearty response and resulted in the organization, under the presidency of Birkbeck, who had meanwhile located in London, of the London Mechanics' Institution. This was followed by the establishment of similar institutions in the larger cities of England and the United States. In the work of promoting and directing this movement, Birkbeck was associated with Brougham, Place, Robertson, Wilberforce, Mill, Grote, Bentham, Hobhouse, and Huskisson. The last mentioned, in his attempt to secure state aid for the enterprise, referred to its work as likely

> to be attended with beneficial results both to the artisans and to the public if properly regulated and directed to . . . the teaching of such of those branches of science as will be of use to the mechanics and artisans in the exercise of their respective trades.[15]

During the next two decades the mechanics' institutes rapidly increased in numbers. By the middle of the century "there were over seven hundred societies scattered through every considerable village."[16]

They multiplied less rapidly in America. Their de-

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[15] S G Godard, *George Birkbeck*, p 68.

[16] Henry Barnard, "On the Aim and Character of the Mechanics' Institute," *American Journal of Education*, Vol 19, p. 332. *Cf.* "Report from the [English Parliamentary] Select Committee on Arts and Their Connection with Manufactures" (printed by order of House of Commons, August 16, 1836), pp. 113-115.

cline in the latter half of the century may be ascribed to two causes, the defectiveness of the elementary education of the working classes and the ineffectiveness of instruction by lectures unsupported by systematic class recitation and discussion.[17]

The Lyceum.—The movement gave rise in the United States to the Lyceum, a modification of the Mechanics' Institute, designed to meet the educational needs, industrial as well as liberal, of a larger section of the population.[18] Though this institution has dwindled to little more than an organization for providing public lectures and other forms of entertainment and instruction, it was at first essentially an association of adults for the purpose of mutual instruction which aimed, among other things, "to apply the sciences and the various branches of education to the domestic and useful arts, and to all the common purposes of life."[19]

The Arts and Crafts Movement

While thus in the early decades of the nineteenth century attempts were made, through instruction in the sciences and arts in mechanics' institutes and the like, to counteract the injurious influence upon the laboring classes of the machine and factory system of manufac-

[17] Fabian Ware, *Educational Foundation of Trade and Industry* (New York, 1901), pp. 18-22; Seventh Annual Report, Western Literary Institute, 1837, p. 157.

[18] In an article on popular education in the *North American Review* for July, 1826, the writer, after noting the rapid growth of mechanics' institutes in England and their introduction into this country suggests that institutions of this sort be established even in very small villages and that farmers and manufacturers as well as mechanics be considered as eligible for membership.

[19] *American Journal of Education*, October, 1826, pp 594-597.

ture, the middle of the century witnessed the rise of a movement for the elevation not only of the so-called working classes, but of society in general, through the study and practice by all of the handicrafts which the Industrial Revolution threatened to destroy. Receiving its initial impulse from Carlyle's[20] panegyrics on the nobility and beneficence of labor, it was developed through Ruskin, Morris, and other disciples.

John Ruskin.—Ruskin taught that the practice of a handicraft is a natural and effective means of developing the faculties of thought and imagination which were repressed and stunted under the factory system.[21] He believed also that general interest in the practice of the handicrafts would tend to obliterate the distinction, which the Industrial Revolution had tended to emphasize, between brain workers and hand workers. "We are always in these days tending to separate the two. . . . It would be well if all of us were good handicraftsmen in some kind, and the dishonor of manual labor done away with altogether."[22]

In *Time and Tide,* he dwells upon the moral, economic, and esthetic values of handwork.

> It would be part of my scheme of physical training that every youth in the state—from the king's own son downward—should learn to do some thing finely and thoroughly with his hand, so as to let him know what stout craftsmanship meant, and to inform him of many things besides . . . The

[20] *Cf. Chartism* Ch iii and *Past and Present* Ch xi 'Labor is life, from the inmost heart of the worker rises his God-given force, the sacred, celestial life-essence breathed into him by Almighty God, from his inmost heart awakens him to all nobleness, . to all knowledge '

[21] *Cf Stones of Venice* (New York, John Wiley & Sons), Vol II, pp 161-163

[22] *Ibid.,* p 169.

result would be in after life that among the middle classes a good deal of their house furniture would be made . . . by the master himself and his sons . . . to the extinction of a great deal of vulgar upholstery and other mean handicraft.[23]

"The real and noblest function of labor," he says elsewhere,[24] "is to prevent crime and not to be Reformatory but Formatory."

As one would infer from such passages as the above, Ruskin would give industrial training a place in the program of the common school. He would plan

every parish school to have a garden, playground and cultivable land around it, or belonging to it, spacious enough to employ the scholars in fine weather mostly out of doors. . . . Attached to the building a children's library, . . . a sufficient laboratory always, . . . attached workshops, many or few—but always a carpenter's, first of those added in the better schools, a potter's.[25]

In his endeavors to free the workman from some of the evils incident to the Industrial Revolution and to increase and extend the cultural benefits of free-hand labor, Ruskin was warmly supported by his disciple, the poet, artist, craftsman, and social reformer, William Morris. The solution of the problem of the amelioration of the condition of the masses Morris found in the cultivation of the art impulses in and through their ordinary handwork.

The efforts of Morris and others to restore what they believed to be the natural connection between art and the handicrafts and to make free and artistic handwork once more a means of general education gave rise to the

[23] *Time and Tide*, Letter 21.
[24] *Arrows of the Chace*, Vol. II.
[25] *Fors Clavigera*, Letter xciv.

Arts and Crafts movement and to a steadily increasing number of Arts and Crafts societies which are exerting an appreciable influence upon the industrial work of the schools.[26]

Systematic Instruction and Training in the Industries as a Substitute for Apprenticeship

While Ruskin and Morris bitterly denounced the Industrial Revolution because it tended to deprive the daily labor of the workingman of much that was stimulating, ennobling, and educative, others deplored its influence in rendering futile and impracticable the time-honored institution which for centuries had ensured to the rank and file of the youth of England an efficient education—the apprenticeship system.

In 1869 James Anthony Froude selected as the theme of his inaugural address as Rector of the University of St. Andrews the importance to individual and national welfare of the system thus being undermined, and the necessity of finding a substitute for it through affording even the humblest laborer some degree of systematic technical and industrial instruction and training.

> Times are changed. The apprentice plan broke down . . . yet the original necessities remain unchanged. . . . The being able to do something and not merely to answer questions, must still be the backbone of the education of every boy who has to earn his bread by manual labor. . . . If there is to be this voice rolling over chaos, again ushering in a millennium, the way of it lies through industrial teaching where the practical underlies the intellectual. The millions must

[26] *Cf. Chautauquan*, September, 1903, and May, 1904 See also, William Morris, *Art and Its Producers* (London, Chiswick Press, 1901), p 19.

ever be condemned to toil with their hands, or the race will cease to exist. . . . The beneficent light when it comes will be a light which will make labor more productive by being more scientific; which will make the humblest drudgery not unworthy a human being by making it at the same time an exercise to his mind.[27]

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CHAPTER VI

INDUSTRIAL SCHOOL EDUCATION OF THE POOR

Summary—Among the earliest institutions to afford systematic training in the industries were the schools established for the children of the indigent poor. Industrial schools for children of this class developed in England in the seventeenth century contemporaneously with the parish apprenticeship system.

Industrial education seems to have been first introduced into general schools on a large scale in Bohemia and as a result of the work of Ferdinand Kindermann. The movement spread throughout Austria and Germany. Its ultimate decline seems to have been due partly to the increasing dominance of economic at the expense of purely educational aims and to the failure to relate the industrial work to the regular course of study.

Pestalozzi's central aim was the elevation through education of the lower classes. For these he considered industrial training of fundamental importance, mainly for economic reasons. Though he held that there were also ethical and psychological reasons for giving handwork a place in school education he gave little attention to it in his schools for the middle and upper classes at Burgdorf and Yverdun. The Pestalozzian schools have not, on the whole, been distinguished for the amount of attention that they have given to industrial training.

A more direct influence has been exerted by Fellenberg, a contemporary, and, to some extent, a coadjutor of Pestalozzi. His plan of combining labor and learning in his schools for the poor at Hofwyl and Meykirch was copied in numerous

orphan, pauper, and reformatory schools in Europe and America.

Early English Industrial Schools for the Poor

A not uncommon motive for the establishment of industrial schools has been the training of the children of the poor in some means of self-support that would relieve taxpayers of the burden of maintaining them. The earliest English schools for industrial training, those organized in the sixteenth and seventeenth centuries, seem to have been established to supplement the parish apprenticeship system in accomplishing this purpose.

In 1591, a knitting school was established in Lincoln, in which an experienced knitter "set on work all such as were willing to come to him."[1] Some five years later we find the town authorities of Leicester making a loan to a Mrs. Clark for stock to be used in teaching children kersey knitting. In the school founded at Great Marlow by Sir William Borlase, in 1628, provision was made for teaching poor boys and girls. The girls were to be instructed in making bone lace as well as in knitting and sewing. In 1642, Mr. Humphrey Walcot founded a school to teach sixteen poor girls to spin flax and wool. The Aylesbury authorities, in 1672, employed one Mary Sutton to teach the workhouse children to make lace.

This custom of setting up institutions for training children of the poor in handwork was introduced into the English colonies in America along with the parish

[1] This and the following four examples are cited by Foster Watson, in *The Beginnings of the Teaching of Modern Subjects in England* (London, 1909), pp. xliii-xliv, from various English county histories and town records.

apprenticeship system. In 1646, for instance, the Legislative Assembly of Virginia decreed

> that commissioners of the several counties respectively do, at their discretion, make choice of two children in each county at the age of eight or seven years at the least, either male or female, which are to be sent up to James City between this and June next, to be employed in the public flax houses under such master or mistress as shall be there appointed, in carding, knitting, and spinning.[2]

The minutes of the Scottish parliament for 1641 show that it was proposed that a school for teaching weaving and the allied industries should be erected in one of the principal towns of each county. To these each parish in the county was to send one or two boys to be taught for seven years.[3]

These institutions illustrate the development of the industrial school from the apprenticeship system, exemplifying as they do an intermediate stage. Their claim to be considered as schools is based upon the number of children receiving instruction at once and upon the extent to which they aim at instruction and training rather than at production.

Toward the close of the seventeenth century, John Locke formulated a system of working schools for the poor, which provided more definitely than did the wide-

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[2] The preamble to this act, XXVII of 1646, reads: "Whereas sundry laws and statutes by act of parliament established, have with great wisdom ordained, for the better education of youth in honest and profitable trades and manufactures . . . as also for the relief of such parents whose poverty extends not to give them breeding, . . be it therefore enacted . . . according to the aforesaid laudable custom in the kingdom of England, That the commissioners of the several counties," etc.

[3] John Edgar, *History of Early Scottish Education* (Edinburgh, 1893), pp. 326-327.

spread parish apprenticeship system for the vocational instruction of the children of the poor. According to this plan, children between the ages of three and fourteen whose parents were dependent upon parish relief were to be employed in working schools, usually in spinning, knitting, or some other branch of wool manufacture. The master workmen of the hundred were to be required to select every other one of their apprentices from among the boys of the working school.[4]

Locke's plan was realized to some extent in some of the charity schools which increased so rapidly in numbers in the early part of the eighteenth century. The annual "Accounts" of these schools show that the girls were commonly trained in knitting, spinning, and sewing. "The Girls learn to read etc. and generally to knit their stockings and gloves, to Mark, Sew, make and mend their Cloaths, several learn to write, and some to spin their Cloaths."[5] In some instances, both boys and girls were given industrial training. In St. Margaret's, Westminster, for example, children of both sexes were set to work, "some upon spinning of wool, others upon mending and making of shoes, others upon sewing and knitting."[6]

Kindermann's Introduction of Industries into the Folk School

In the latter part of the eighteenth century there developed on the continent an important movement for

[4] Robert H. Quick, *Locke on Education* (Cambridge, 1902), pp. 189-191

[5] "Account of Charity Schools Lately Erected in England," etc. (1709).

[6] "Account," etc. (1712).

the introduction of systematic industrial training into the folk school. Its leader, Ferdinand Kindermann (1740-1801), a Catholic clergyman, had been active, even as a student, in the promotion of the reform of popular education fostered by Maria Theresa and her successor. In 1773, he introduced certain industries into his parish school at Kaplitz, as a means of improving the moral character, the industrial efficiency and, through these, the economic condition of the people. As to the considerations which led him to make this innovation, Kindermann writes:[7]

> Upon closer observation of the folk schools I perceived that in them the young were trained least in what they most needed; that they learned much that was useless and almost everything in the wrong way. Here I saw the sources of the idleness, of the poverty and of not a few of the vices of the people. . . . I was convinced that our folk schools in addition to teaching the regular subjects must develop in our youths habits of industry; that classes in handwork should be organized and related to the literary subjects and that in these pupils should be trained and accustomed to work from early childhood.

The marked utilitarianism of Kindermann's aims resembles that of the educational systems which developed under the influence of pietism and the Enlightenment.[8] This resemblance may be something more than merely accidental, for it is possible to trace a quite definite connection between his work and that of Francke. One of the most painstaking of the students of the work of Hecker,[9] the pupil of Francke, was the Austrian school reformer, Felbiger, and it was to Felbiger that Kinder-

[7] Quoted by Rissmann, *Geschichte des Arbeitsunterrichtes im Deutschland*, p. 26.

[8] See pp. 18-20 and 33-36.

[9] See above, pp. 45-46.

mann resorted for advice and assistance when he undertook the reform of the Bohemian folk schools.[10]

Under Kindermann's plan, the pupils were enabled to earn enough to pay at least part of their school expenses. At the same time, they cultivated a spirit of industry and prepared themselves for a vocation.

Among the industries taught to both boys and girls were the spinning of cotton and flax, the carding of wool, knitting, sewing, lace making, silk culture, and gardening.

In practice, the new system of education seems to have fallen more and more exclusively under the dominance of economic aims. No attempt seems to have been made either to correlate the industrial occupations with other parts of the curriculum or to introduce them into schools other than those attended by the children of the poorer classes.

The plan was adopted not only in Bohemia, where some two hundred schools gave instruction in the industries, but also in various other parts of the empire and of the continent.

After the death of Joseph II, industrial training in the schools seems to have been more and more neglected, until finally it was dropped altogether. The work had been continued long enough, however, some believe, to exert a helpful influence on the life of the people. Helfert, in the following passage, claims for it a share in the subsequent industrial development of Bohemia.

Although little is left to-day of Kindermann's magnificent creation, its wholesome influence is still felt For if at present

[10] Ziegler, *Geschichte der Padagogik* (Munchen, 1904), pp. 243-244; Rissmann, *op cit*, p 26

Bohemia occupies so high a place in the industrial statistics of the Austrian empire, if in many branches of industry it surpasses all other states of the crown and in only a few instances admits the superiority of other states in this or that industry, then in recounting the list of causes to which this condition of affairs is due we must not forget the name of the great school reformer who, almost entirely without public assistance, by his rich gifts of mind and heart and the self-sacrificing coöperation of those from all classes of society whom, through his appeals, his exhortation and encouragement he called and held to the work, has made the folk school the chief foundation of national prosperity.[11]

The Extension in Germany of Industrial Education for the Poor

Kindermann's plan of affording industrial training in elementary schools for the poor was introduced into Germany, in 1784, by Pastor L. G. Wagemann. The establishment of the latter's industrial school in Gottingen marks the beginning of a movement in which the utilitarian and economic tendencies characteristic of the period of the Enlightenment combine with a widespread interest in the moral elevation of the masses through education.[12] The movement was promoted through the publication by Wagemann, from 1788 on, of the *Göttingen Magazine for Industry and the Care of the Poor.*

It was not long before the new trend in popular education began to attract the attention of the governmental

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[11] Johann A. Helfert, *Die Grundung der oesterreichischen Volksschulen unter Maria Theresa,* p. 433. Quoted by Rissmann, *op. cit*, p. 27.

[12] Wagemann's friend, Professor (of Theology) Heinrich Sextro, attempts in 1785 in his work, *On the Education of Youth to Industry,* to discover a philosophical foundation for school education in the industries.

authorities in various German states. In the last decade of the eighteenth century, industrial schools were established in Hanover, Würzburg, Lippe, Mecklenburg, Brunswick, and Nuremberg, as well as in other parts of Germany.[13] In Württemberg a spinning school was established in 1795. General rescripts issued by the government in this and the following years were successful in inducing the people to set up many similar institutions.

In Prussia the movement made little progress previous to 1798, when the General Directory touched upon the subject in a memorial to the king, urging that measures be taken "to accustom village youth early to a life of industry and to instruct them in occupations such as spinning, knitting, sewing, tree culture, gardening, silk culture, etc., which would be of use to them in their future station in life." Industrial schools were recommended as "the most effective means of weeding out idleness among the peasantry and preventing their impoverishment."[14] A royal circular of 1799 ordered that instruction in the industries should be introduced into the garrison schools.

In Baden, where the plan had already been followed in the so-called "economic schools," its general adoption was ordered in an edict of 1803. Similar measures were taken during the same decade in Bavaria, Hesse-Darmstadt, Kassel, Meiningen, Detmold, Dessau, Rostock, and elsewhere.[15]

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[13] See, for example, G. Ulbrecht, "Die Industrieschulen der Kurmark," *Zeitschrift für Gesch. d. Erziehung und d. Unterrichts*, Vol 1, pp 86-95.

[14] Rissmann, *op cit*, p. 30.

[15] *Ibid.* H Heppe, *Gesch. d deutschen Volksschulwesens*,

The literature of this movement lays most stress, perhaps, upon the importance to the welfare of the individual and the state of cultivating skill and habits of industry especially among the young of the lower classes. In this way, it was believed, the most common source of poverty could be removed.

Attention was directed also to the influence of these schools upon industry and commerce in general. Adam Smith had pointed out that the progress of civilization, and especially the adoption of the principle of the division of labor, necessitated a higher standard of education for the lower classes. He believed further that this education should be both cultural and industrial.[16] Certain German writers of the period, such as Lachmann[17] and Resewitz,[18] in elaborating Smith's views, assert that this higher standard of culture must be brought about deliberately and systematically through the agency of the state, individuals and families being incapable of appreciating the motives for providing such instruction.

Another end sought in these schools was that to which the promoters of the American Manual Labor School movement of the thirties gave so much attention, namely, that of enabling students to earn money while pursuing their studies.

It was probably the increasing diversion of the ener-

Vol. 3, p 318. *Cf.* Georg Kerschensteiner, *Idea of an Industrial School*, p. 27.

[16] *The Wealth of Nations*, Book V, Part III, Article II. See also above, p. 66.

[17] Karl Ludolf Friedrich Lachmann, *Das Industrieschulweser* (1802), quoted by Rissmann, *op. cit*, p. 31.

[18] F. G. Resewitz, *Gedanken, Vorschlagen und Wunschen zur Verbesserungen der offentlichen Erziehung* (1779), quoted by Rissmann, *op. cit.*, p. 31.

gies of teachers and pupils in this direction which more than anything else accounts for the decline of the schools. Only those employments were selected for school purposes which promised the largest income or which afforded the most direct preparation for the future vocation of the child. Girls were trained usually in spinning, knitting, sewing, and mending. Boys in the country were taught gardening, silk culture, and beekeeping.[19]

Pestalozzi as an Advocate of Industrial Education for the Poor

A much wider and profounder influence upon the education of the poorer classes was exerted by the Swiss reformers, Pestalozzi and Fellenberg. The influence of the former has been especially marked in elementary public schools in Europe and America. The work of the latter has left its impress upon special schools for the poor.

Pestalozzi was primarily a philanthropist whose one central aim in life was the alleviation of the wretchedness of the lives of the poor.[20] The first step, he believed, to be taken in working toward this end was that of fitting them to achieve and maintain economic independence through the mastery of some handicraft. He writes:[21]

> The end which we should hold before ourselves in training the children of the lowest classes is to enable them without capital of any kind, not only to find the means of subsistence wherever their lot may be cast, but also to practice several different kinds of crafts.

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[19] Rissmann, *op cit.*, p. 32

[20] Pestalozzi, *How Gertrude Teaches Her Children* (Syracuse, 1898), Vol I.

[21] Pestalozzi, *Works*, Seyffarth edition, Vol. I, p. 293.

Economic independence was to be secured, however, through the mastery not only of one or more of the handicrafts, but also through the attainment of skill in agriculture and in domestic management. This combination, he insists, "is for the educational training of the poor, so much the more essential since the individual who is trained in one only usually loses the advantages of such training through his ignorance of the other two."[22]

The curriculum adopted by Pestalozzi at Neuhof in his earliest attempt to educate the children of the poorest classes was drawn up in accordance with these views. The pupils were employed in sewing, knitting, cotton spinning, and in garden, field, and housework.

> The philanthropist who wishes to educate the children of the poor will manifest the greatest wisdom in developing in them skill in those crafts which will afford them the most certain means of support in the locality in which they live.

Though at first Pestalozzi seems to have utilized the industrial arts mainly as a means of fitting the pupil to make a living, he later comes to lay more and more emphasis upon them as a means of general education. In order to satisfy his wants, man must not only know and think, but do. The attainment of that harmony of thought and action so essential to true contentment depends upon the cultivation of the powers of doing along with those of thinking and knowing. To cultivate knowledge and neglect skill is to give a warped and one-sided education and to put the individual out of harmony with himself and with the world about him. Training

[22] *Ibid.*, Vol I, p. 295.

in the industries not only creates this condition of inner and outer harmony, but it cultivates the understanding and the feelings, controls the appetites, and exercises in various other ways a beneficial influence.[23]

Many of these benefits are referred to in a passage in *Leonard and Gertrude.* The recently established village school at Bonnal was provided with workbenches, lathes, and a smithy. The results of the industrial training afforded met the highest expectations of the master, Glülphi.

> Every day it became clearer that . . . industry and the physical activity of our race was the one true . . . means of uniting the entire circle of human powers into a single, common power, the power of humanity. Every day he perceived more and more how industry forms the understanding and gives power to the feelings of the heart, how it protects the vigor and the purity of life from deadly sensual excess, prevents the imagination from wandering, represses the loquacity of vain tongues, preserves our natural sense of duty and prevents us from mistaking thought for action, from considering accounts of heroism as heroism itself, and from confusing mere dreams of the divine power of faith and love with the reality.[24]

Though the most convincing of the arguments presented by Pestalozzi in favor of training in handwork would apply to the education of the middle and upper classes, as well as to that of the laboring class, nevertheless, he, like Kindermann, Wagemann, and other reformers of the time, thinks of it chiefly as a feature of

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[23] Pestalozzi, *How Gertrude Teaches Her Children,* Letter ii, p. 82, and Letter xiii.

[24] Pestalozzi, *Leonard and Gertrude,* edited by Mann, Vol. II, p. 426; quoted by Rissmann, *op cit*, p. 37.

the education of the poor. Referring to Krüsi, he says:[25]

> He had learned much and varied manual skill, which in the lower ranks so often develops the basis of higher mental culture, and raises men who have enjoyed it from childhood to general and comprehensive usefulness.

Little attention seems to have been paid to it in his schools at Burgdorf and Yverdun. Ramsauer informs us that students in these schools, who were preparing to become teachers in schools for the poor, were sent to acquire the requisite industrial training in the workshops of artisans.[26]

In his earlier years, Pestalozzi believed that industrial training, and, indeed, the entire systematic training of the child, could be best carried on in the home. The growth of the Industrial Revolution in Switzerland and other causes, however, led him gradually to recognize the necessity for schools.[27] The conditions necessitating this transition from the domestic to the school system of training are described in an interesting manner in *Leonard and Gertrude.*

The recognition by Pestalozzi of the importance of the school as a means of educating the poorer classes brought into prominence the problem of the correlation of industrial training with the other subjects of the curriculum. In an article on that subject written in 1790, he outlines a course of study and gives some rather interesting suggestions as to methods of giving instruction and training

[25] Pestalozzi, *How Gertrude Teaches Her Children,* p. 82.

[26] Eduard Wiessner, *Gesch. d. Handfertigkeitsunterrichts für Knaben,* in Carl Kehr, *Gesch. d. Methodik* (Gotha, 1899), Vol. 4, p. 266

[27] Alfred Heubaum, *Pestalozzi* (Berlin, 1910), p. 144.

in the industries. The course of study in his proposed school for the poor is to consist of the industrial subjects already mentioned, namely, agriculture, domestic economy, and one or two forms of handicraft,[28] combined with the ordinary elementary school subjects, reading, writing, and arithmetic. After emphasizing the importance of industrial training, he proceeds to the discussion of the problem of imparting it in the school. The importance of securing a suitable textbook is dwelt upon. This should, in the first place, set forth in an attractive manner the principles underlying agriculture and the domestic and industrial arts. It should make clear the value of a mastery of these three branches of industry and the possibility of making use of them anywhere. The instruction afforded in the book must be capable of adaptation to local circumstances. Finally, it should give the life histories of men who in different branches of industry, and especially through the combination of domestic, field, and shop work, have, without capital and in the midst of unfavorable conditions, acquired a competency.[29] The mastery of these three branches is to be developed mainly, however, through actual practice. There should be a workshop for the crafts, a field or garden for agriculture, and a complete home in which the pupils might be trained in household management. As for the ordinary school subjects, special attention should be paid to arithmetic.[30]

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[28] Just these were recommended for incorporation into the program of the elementary schools of Massachusetts in 1906. See Report of (Mass.) Commission on Industrial Education (April, 1906), p 20.

[29] *Cf The Works of Samuel Smiles*

[30] Pestalozzi, *Works*, Seyffarth edition, Vol 1, pp 292-298.

Pestalozzi's procedure in industrial as well as in liberal education was, unfortunately, based, in part, upon the conviction that the natural and easy method of developing knowledge or skill in the pupil was to resolve the subjects or the exercises into their elements and to present these in proper sequence. Just as language teaching was to begin with drill in elementary sounds, or instruction in writing with making simple straight or curved lines, so the earliest industrial training was to consist of exercises in striking, lifting, throwing, pushing, pulling, turning, twisting, and swinging. "These," says Pestalozzi, "although among themselves essentially different, contain the elements of all possible operations upon which human handicrafts depend, even the most technical." [31]

It would be easy to exaggerate the importance attached by Pestalozzi to industrial training as part of the education even of the poorer classes. He believes it to be indispensable for the masses, for all must be trained to economic efficiency, but it falls far short of meeting all their educational needs. Pestalozzi is throughout the champion of the right of the common people to a liberal education which will develop "harmoniously" their innate powers. To accomplish this, much more than mere training in a handicraft is necessary.[32] Even education in the industries "is an application of the general education of man to the particular phase of earning his bread, and only then is it true industrial training when it goes forth from the complete enjoyment and compre-

[31] Pestalozzi, *How Gertrude Teaches Her Children*, pp. 276-278.
[32] *Ibid.*, pp. 126, 324.

hensiveness of that which the general education of mankind demands.'' [33]

This feature of Pestalozzi's educational views may serve to explain the relatively small amount of attention paid to industrial education in Pestalozzian schools. The school at New Harmony, Indiana, organized and directed by Joseph Neef and by William Maclure, both disciples of Pestalozzi, afforded, indeed, industrial training as well as general education, but in this it stands alone among the Pestalozzian schools of America.

Fellenberg as a Promoter of Systematic Industrial Education

To Emanuel Fellenberg, the son of one of Pestalozzi's intimate friends, and for a time his partner, may be traced much of our present system of employing the industrial occupations as a means of education in institutions for the care of orphaned or delinquent children or for children of Indians or Negroes.

Fellenberg is one of the most notable and influential of the men of this period who tried through a reform of existing systems of education to improve the condition of human life. This end, he believed with Plato, was to be attained through the training of individuals to a more efficient and intelligent performance of the duties appertaining to their station in life. He strove further to bring about a condition of greater harmony among the different classes.[34] To promote the attainment of this end he established upon his estate at Hofwyl separate educational institutions for the youth of different social

[33] Pestalozzi, *Works*, Seyffarth edition, Vol. 9, p. 599.
[34] John Griscom, *A Year in Europe*, Vol. I, pp. 382-383.

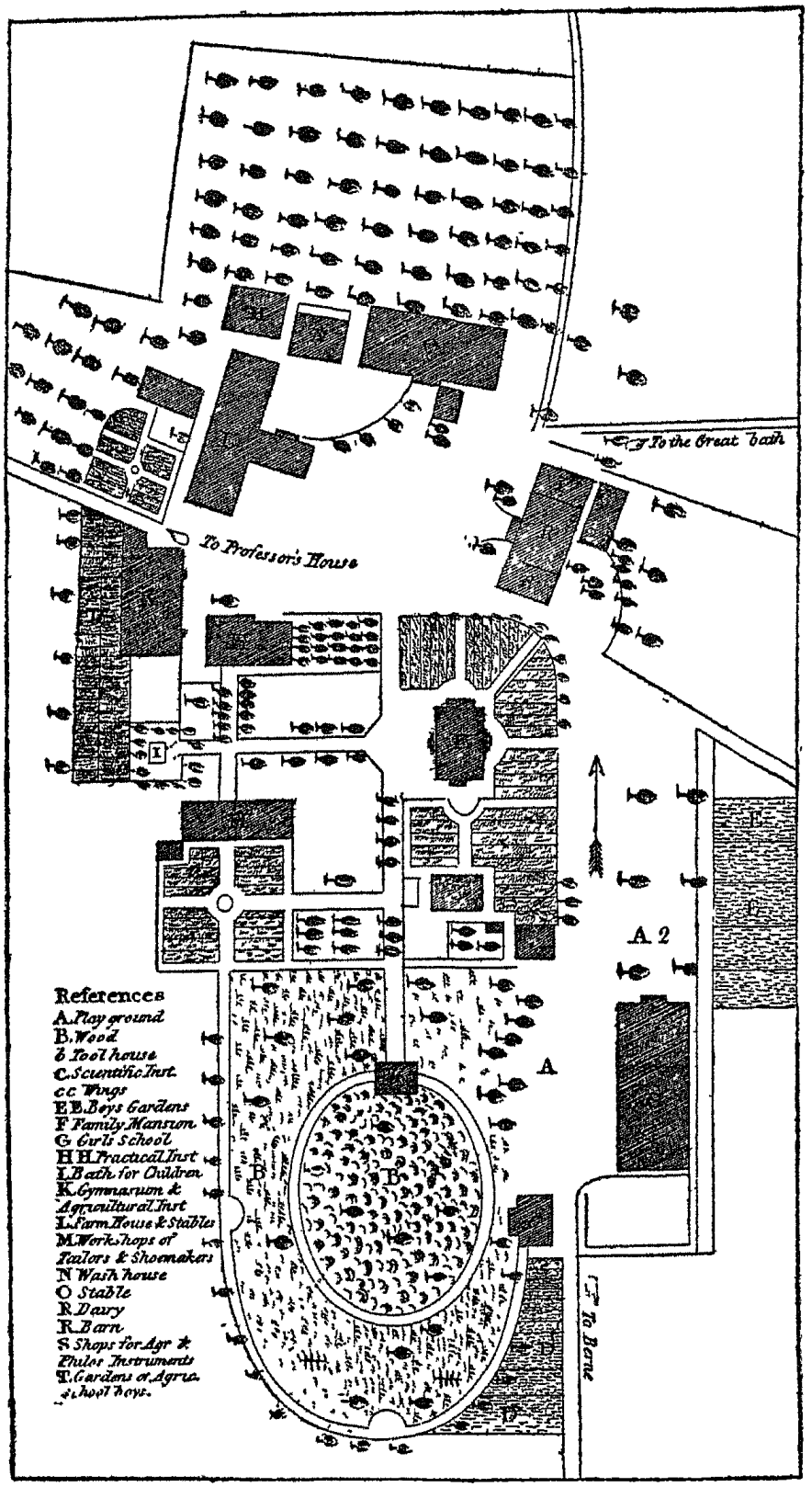
ranks. Especial attention was paid to the education of the classes at the extremes of the social scale, the laboring class and the aristocracy to which Fellenberg himself belonged.

While some attention was given to agriculture and the handicrafts in the gymnasium reserved for the more aristocratic youth, industrial, and especially agricultural, labor constituted the chief means of education for those of the lower classes. "Necessity compels us," writes Fellenberg,[35] "to find the means of education in the bread-winning occupations; hence the vocational training of the children of the poor is from the earliest childhood interwoven in the most intimate fashion with their elementary education." During most of the year, the children of the poor school at Hofwyl were employed almost exclusively in agriculture. In winter, however, they took up other occupations such as straw weaving, basket weaving, and knitting. Ordinary school instruction was given only during recreation hours.

A notable feature of the work of Fellenberg's institution was the skill with which Wehrli, master of the poor school, imparted instruction to his pupils during their hours of labor.

> While working with them in the fields he told them instructive stories, gave them problems in arithmetic to solve and endeavored to find in the field work itself occasion for further instruction. He explained the properties of the soil with which they were working, led them to examine it in regard to its composition, weight, chemical action, its capacity to retain heat and moisture. He drew their attention to the char-

[35] Emanuel Fellenberg, *Darstellung der Armen-Erziehungan-stalt in Hofwyl* (Aarau, 1813), p. 8; quoted by Rissmann, *op cit.*, p. 38.



PLAN OF HOFWYL

[From *American Annals of Education*, Vol I]

acteristics of the plants which they found, explained to them natural phenomena, and, in connection with the laying out of plots in the fields he made them familiar with some of the fundamental principles of geometry.[36]

Fellenberg's work had a marked influence upon the development of industrial schools for poor or neglected children in Germany, France, Belgium, and England. One of the most remarkable of these institutions was the "Rauhe Haus" established by Johann Heinrich Wichern in Horn, near Hamburg, in 1833. The pupils of this institution were required to engage not only in domestic and field work, but to supply through the practice of the handicrafts the clothing, furniture, and other equipment needed by the institution. There were shops for many different trades, including wool spinning, shoemaking, tailoring, and cabinetmaking. Even the buildings were erected by the inmates.

About 1840 an agricultural colony was organized after Fellenberg's plan, at Mettray, near Tours, in France. Many other similar institutions were established, not only in France, but also in Holland, Belgium, and England. In the last-mentioned country, the Fellenberg movement seems to have brought about a revival of interest in the establishment of "schools of industry."[37] A "Proposal for the Establishment of Village Schools of Industry," published in London in 1831, recommends that "besides gardening, the children should be taught such trades as local and other circumstances might render desirable: masonry, shoemaking, tailor's, carpenter's, blacksmith's work, netting,

[36] Rissmann, *op. cit*, p. 39.
[37] *Cf.* p. 64.

knitting, etc. Some of these might form also direct subjects of instruction.'' [38]

The apparent success achieved by Fellenberg in educating the poorest classes, mainly through and for hand labor and at little or no expense, suggested the establishment of similar schools in the United States. An article descriptive of the Swiss reformer's work was reprinted in the earliest of American educational journals, the *Academician,* in 1819. In a note, the editor recommends the adoption in this country of similar institutions for the children of the poor.

> A farm of a few acres in the neighborhood of New York, Philadelphia, Baltimore, etc., and divided into convenient lots or gardens which might be worked by boys, under the direction of intelligent superintendents, would produce vegetables and other articles for the market, which, when sold, would be nearly sufficient to defray the whole expense of the establishment.[39]

John Griscom concludes his account of Fellenberg's school for the poor by saying: [40]

> I have but little doubt that on a good productive farm of 250 or 300 acres, provided with suitable buildings, . . . and well stocked, a school of twenty-five or thirty boys, conducted on the plan of Fellenberg's poor school, would maintain itself and leave a gain in favor of the proprietor.

Griscom's proposed adaptation of Fellenberg's plan was carried out not only in the establishment of houses of industry in New York City and elsewhere, but also,

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[38] Reprinted in *American Annals of Education,* January, 1832, p 44.

[39] *The Academician* (New York, 1819), Vol I, p. 327.

[40] John Griscom, *A Year in Europe,* Vol. 1, p 399.

to some extent, in the organization of the American Manual Labor Schools.[41]

The last-mentioned institutions are occasionally mistaken for industrial schools. Their purpose, however, was not that of fitting students for industrial life, but rather that of enabling them, while pursuing a regular literary and scientific course of study, to earn, through some form of manual labor, sufficient money to defray the whole or part of their expenses. The Fellenberg schools, as industrial and vocational schools more or less self-supporting, persist, for the most part, as schools of the types recommended above by Griscom and the editor of the *Academician*, that is, as schools for abandoned, orphaned or delinquent children, or as schools for the so-called "backward" races.

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CHAPTER VII

CULTURAL INDUSTRIAL EDUCATION

Summary.—Toward the close of the eighteenth century there develops a vigorous movement to utilize the manual activities as a chief means of general education. J. H. G. Heusinger, in a pamphlet published in 1797 entitled, "On the Utilization of the Child's Powerful Tendencies Toward Activity," argues that the impulse toward bodily activity as one of the most powerful and most enduring should be given special consideration in any rational system of education. Though he presented many plausible arguments in support of his thesis, it was only later and largely through the writings of Froebel that this view was brought to public attention. It was most extensively applied at first in the kindergarten and in the revised sloyd system.

Froebel's work on behalf of manual and industrial education was continued by his disciples, Märenholtz-Bulow, Georgens, Hanschmann, and others. His influence operating through the kindergarten, the revised sloyd system, and possibly in the Russian system of manual training, has been one of the most powerful single factors contributing to the adoption of handwork into the program of the general school.

Certain of the Herbartians also favored industrial education; Ziller, for instance, for purposes of vocational preparation, and Barth for purposes of general education.

Heusinger

While thus the value of school training in a handicraft as a means of promoting the economic efficiency of the poorer classes was becoming more and more generally recognized, certain educational reformers were begin-

ning to draw special attention to its importance as a means of general education. A new period in the history of industrial education may be said to date from the publication by J. H. G. Heusinger, in 1797, of a pamphlet entitled "On the Utilization of the Child's Powerful Tendencies Toward Activity."[1] The work was an attempt to demonstrate from psychological principles the right of the industrial occupations, not merely to a place, but to the chief place in the school program. It pointed out that the strongest and most enduring impulse in children was that towards bodily activity, and that the strength of this tendency showed that it was destined to play a leading rôle in the development of man, and hence, in education. It contended further that the intimate relation naturally existing between the impulses to knowledge and to bodily activity suggests that they should be gratified together whenever possible.

The pamphlet was intended to prepare the way for a larger work on education entitled *The Werthheim Family.*[2] In the complete system of family education described in this work the industrial occupations hold a central position.[3]

The first requirement in education, Heusinger asserts, is formation of character, that is, the development of the ability to carry out what one has begun and has recognized as true and good.[4] To this end it is necessary to keep the pupils employed in activities directed toward the attainment of some immediate end. This condition is

[1] "Ueber die Benutzung des bei Kindern so thätigen Triebes, beschäftigt zu sein" (Reutlingen, 1797).

[2] Heusinger, *Die Familie Werthheim* (Gotha, 1798-1809).

[3] *Ibid.*, Vol I, p. 65.

[4] *Ibid.*, Vol. I, p. 41.

fulfilled, in Heusinger's plan, by appointing the children to definite duties or offices [5] and by employing them in some form of handwork. He demands a carefully arranged succession of manual occupations for the entire period of education. The benefits accruing to the pupil from these, he believes, are manifold. They (1) exercise the mind and shield the pupil against idleness, (2) gratify the natural tendency to employ the mind and hand together, (3) promote health, (4) cultivate mental ability and skill of hand, (5) prepare for a vocation, (6) cultivate a taste for art, (7) train to an appreciation of good craftsmanship, (8) lead to an acquisition of knowledge of subjects that would otherwise be neglected, (9) and afford instruction in the most natural and direct manner.[6]

The handwork is to be correlated as far as possible with the ordinary subjects of the school curriculum. It is to be selected with this end in view.

> Those varieties of handwork which naturally occasion frequent references to the principles of mechanics, geometry, and natural science, and lead to numerous experiments and much experience and observation which can be utilized in instruction, these are of greatest importance.[7]

These considerations lead him to recommend work with pasteboard, papier-mâché, wood, tin, brass, clay, wax, and gypsum. Handwork, Heusinger insists, is one of the most important means of acquiring knowledge. Direct knowledge of an object, he asserts, may be any one of three kinds. It may arise from sense impressions,

[5] *Ibid.*, Vol. I, pp. 46-50.
[6] *Ibid.*, Vol. I, pp. 54-61.
[7] *Ibid.*, Vol. I, p. 64.

from feelings, or from the effort we expend in dealing with an object. He emphasizes the importance of the last kind of knowledge, which he distinguishes as "dynamic." It is the wealth of dynamic experience afforded by the industrial activities which entitles them, in his opinion, to the central position in the curriculum.[8]

Froebel

The man who won recognition, however, as the leader in the movement for utilizing handwork as a means of general education is not Heusinger, but Friedrich Froebel. It is not unlikely that some injustice has been done here to the earlier reformer. That Froebel was familiar with Heusinger's work is shown by his occasional references to the latter.[9] Moreover, the similarities between the views of the two men are too numerous to be due altogether to chance.[10]

Both men were, of course, influenced by the main currents of the thought of their time. The influence of the philosophical revival on Froebel is especially marked. His advocacy of handwork as a means of education is based in part, for instance, upon the doctrine promulgated by Schopenhauer that not perception or thought, but the will, is primary and fundamental in the evolution of the individual and the race.[11]

[8] "Ueber die Benutzung des bei Kindern so thätigen Triebes, beschäftigt zu sein," p. 38.

[9] See, for instance, the references in the *Sonntagsblatt* published by Froebel from 1837 to 1839.

[10] A well-thumbed and annotated copy of Heusinger's "Ueber die Benutzung des bei Kindern so thätigen Triebes beschäftigt zu sein," was found among Froebel's effects after his death. *Cf.* Rissmann, *op. cit.*, p. 25, note.

[11] Froebel, *Werke*, Vol. 1, p. 244; quoted by Rissmann, *op. cit.*, p. 49.

Since in contemplating the growth and development of the human race it becomes evident that doing, acting, representing preceded thought, reflection and knowledge, and, secondly, that thought, reflection and knowledge are tested and developed through action and representation, it follows that in our work of instructing and educating action and representation should precede knowing and understanding. The pupil thus achieves and creates for himself his own knowledge and understanding which is in consequence a living, life-giving, life-stimulating knowledge which continually develops out of itself.

The central importance of manual and industrial occupations is deduced by Froebel, also, from his conception of education as the development of the individual to an adequate manifestation of the divine principle within him.[12]

God created man in his own image; therefore, man should create and bring forth like God. His spirit, the spirit of man, should hover over the shapeless, and move it that it may take shape and form, a distinct being and life of its own. This is the high meaning, the deep significance, the great purpose of work and industry, of productive and creative activity. . . . The debasing illusion that man works, produces, creates only in order to preserve his body, in order to secure food, clothing and shelter, may have to be endured, but should not be diffused and propagated. Primarily and in truth man works only that his spiritual, divine essence may assume outward form, and that this he may be enabled to recognize his own spiritual, divine nature and the innermost being of God. . . . The young growing human being should, therefore, be trained early for outer work, for creative and productive activity. . . . Every child, boy and youth, whatever his condition or position in life, should devote daily at least one or two hours to some serious activity, in the production

[12] *The Education of Man* (New York, 1903), Sec. 15.

of some definite, external piece of work. Lessons through and by work, through and from life, are by far the most impressive and intelligible. . . . It would be a wholesome arrangement in schools to establish actual working hours similar to the existing study hours; and it will surely come to this.[13]

In other passages more practical reasons are presented in favor of school training in the industries. Industrial occupations promote, Froebel believes, both physical and intellectual development; hence they should be given a place in the programs not merely of elementary but also of secondary schools.

It is surely one of the greatest faults of our current school arrangements, especially of the so-called Latin and high schools, that the pupils are wholly debarred from outwardly productive work. . . . Genuine experience shows that external, physical, productive activity interspersed in intellectual work strengthens not only the body but in a very marked degree the mind.[14]

Froebel follows Heusinger in urging that boys be given "some definitive domestic duties to perform," and especially that the older boys "be set by parents and teachers to doing things independently and alone, so that they may attain firmness and the art of self-examination in their actions."[15] He suggests further that, under certain circumstances, "they might even receive regular instruction from mechanics and farmers."[16]

But Froebel did much more than merely advocate the utilization of the manual and industrial occupations as a means of general education. He gave these an important place in the actual practice of his schools. Some

[13] *Ibid.*, pp. 31-35.
[14] *Ibid.*, p. 236.
[15] *Ibid.*
[16] *Ibid.*

attention was paid to handwork even in his earliest efforts as an educator. As a private tutor in Frankfort he was careful to gratify "the impulses of his pupils toward activity and representation." He began with the simple art of impressing designs upon paper. From this he proceeded to cutting out forms first in paper and then in pasteboard and wood.[17]

The industrial occupations were a notable feature also of the work at Keilhau. Lange, in describing school activities there, says:[18]

> In their attempts to arouse the impulse to learn they made use not only of curiosity and direct observation but also of bodily labor. In and through this work both the need of and the impulse toward enlightenment and instruction were to be aroused. To this end the pupils were employed not only in the cultivation of nature but also in all sorts of technical employments in workshops which either afforded indirectly occasion for instruction or at least could be connected here and there with their regular instruction.

Froebel's opinions as to the importance of handwork as a means of education were courageously adhered to in the curriculum planned for the proposed school at Helba. He states in his announcement that "the institution will base its work on the pupil's personal efforts in work and expression, making these again the foundation of all genuine knowledge and culture."[19] The first half of the day was to be devoted to the study of the regular school subjects. The afternoons were to be

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[17] Froebel, *Werke*, Vol. I, p. 32; quoted by Rissmann, *op. cit.* p. 47.

[18] *Ibid.*, Vol. I, p. 20.

[19] Quoted by Hugo Elm, *Der Deutsche Handfertigkeitsunterricht*, pp. 24-29.

given up to work in the house, farm, or garden. The list of occupations resembled that recommended by Blasche.[20] It includes the cutting of wood for the kitchen or furnace; the making of simple wooden kitchen utensils; the weaving and binding of mats for the table or floor; the binding of books and the ruling of slates and paper; the making of a variety of collections of objects of nature and art, and of suitable receptacles for these; the care of the garden, the orchard, field; the care of poultry; the preparation of artistic and geometrical forms in folding, cutting and mounting, pricking, and weaving paper; the use of pasteboard in making stars, wheels, boxes, napkin rings, card baskets, lamp shades, etc.; play with splints, tablets, sticks, and peas; the whittling of boats, windmills, water wheels, etc.; the making of chains and baskets from flexible wire; modeling with clay; drawing and painting.

It is through the kindergarten, however, that Froebel's doctrine of the educational importance of the manual occupations has probably exerted the widest influence. Adopting the principle that "play is the work of the child," he employs in this institution two classes of exercises, namely, plays, including all those activities which are ends in themselves, and play occupations which aim at producing some definite result, but which are carried on without compulsion.

A comparison of the kindergarten occupations with those recommended by Kindermann or Pestalozzi reveals the central importance of handwork in Froebel's system of education. While the former have in mind mainly the economic needs of the pupil in selecting

[20] Elm, *op. cit*, pp. 24-29.

manual employments, the latter selects them solely with a view to their value in promoting the ends of general education.

These occupations afford, nevertheless, further[21] evidence of Froebel's indebtedness to earlier promoters of educational handwork. The blocks which he uses had been described by Lavater.[22] Courses and methods of training in paper cutting, pasteboard work, and modeling had been worked out both by Heusinger[23] and Blasche.[24] Paper weaving and constructive work with peas and sticks had long been in use as children's occupations in Thuringia.[25]

The marked influence which Froebel has exerted upon the theory and practice of industrial education in Europe and America has been due, not only to his writings and to the growth of the kindergarten movement, but also to the general adoption of the practical application of Froebelian principles worked out by Cygnaeus in Finland, and by Salomon in the Swedish sloyd system.[26]

Uno Cygnaeus

The application to public school work of Froebel's doctrines as to the educational value of manual and industrial occupations was first made in 1866 by Uno Cygnaeus, the founder of the present school system of Finland. He had been commissioned by the Finnish

[21] See p. 101 and notes 9 and 10.

[22] Elm, *op. cit.*, p. 32.

[23] J. H. Heusinger, *Die Familie Werthheim* (Gotha, 1798), Vol. 1, pp. 154-179.

[24] Bernhard Blasche, *Die Werkstätte der Kinder* (Gotha, 1800).

[25] Elm, *op. cit.*, p. 32.

[26] *Addresses and Proceedings of the National Education Association*, 1889, p. 105; 1894, p. 878.

senate to investigate the folk school systems of France, Germany, and Switzerland. On his travels he became acquainted with the writings of Pestalozzi and Froebel. Their influence upon him may be best described in his own words. In a letter to the editor of the *Rheinische Blätter*[27] he writes: "The idea of the introduction of handwork came to me from the study of the writings of Pestalozzi and Froebel; I have therefore derived it from Germany." After speaking of the defects of Pestalozzi's method of teaching through observation, he continues:[28]

> Then came Froebel who urged that the child must not only practice intuition, and express the idea which he has just received, but should also learn to carry out in play, and in smaller pieces of handwork, what he has grasped—should as a productive being be educated from the beginning to self-activity and productive energy—should thus be educated through work for work. . . . In this way I was led to the thought that we must introduce into the school not only Froebel's gifts and the rest of the exercises in work recommended by him, but also establish for elder children such kinds of handwork as have for their aim the training of the hand, the development of the sense of form, and of the esthetic feeling, and which help young men to a general practical dexterity, which shall be useful in every walk of life. . . . But all these kinds of work must not be conducted as trades, but always with reference to the aim of general education and as a means of culture.

In 1861 Cygnaeus became inspector and was charged with the duty of organizing primary instruction in the schools of Finland. Two years later he assumed the

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[27] *Rheinische Blatter für Erziehung und Unterricht* (1882), Heft III

[28] Quoted by H. Courthope Bowen, *Froebel* (New York, 1899), pp. 190-191.

directorship of the normal school at Jyväskylä. Manual training was at once given a place in the regular course of study. The law passed by the senate of Finland in 1866, creating a national system of primary schools, is in accord with Cygnaeus's views.[29] It exalts the influence of technical manual work in education claiming that it "develops the spirit of observation, taste, skill, and the love of work." It provides that manual training shall be obligatory in normal schools and in rural schools, and optional in city schools.[30]

The sloyd system which has exerted so marked an influence in the development of manual education in England and America is the result of the application of Froebelian doctrines to a course in handwork designed originally to foster the domestic industries of Sweden.[31] The progress of the Industrial Revolution threatened to work serious hardship upon the Swedish peasants, many of whom eked out their scanty income through the sale of various articles manufactured in their homes during the long evenings of the northern winter.[32] To maintain

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[29] Cygnaeus's activities as a promoter of manual and industrial education are not to be ascribed entirely to the influence of Froebel, Pestalozzi, and others. From childhood he had shown marked predilection for the manual occupations. In this he was encouraged by his father, who without relaxing the requirements of a severe course of study in the regular schools, sent him at times into the workshops for practical training in the handicrafts. His appreciation of the value of industrial education owes something also to his experience as pastor of a primitive Finnish community at Sitka, Alaska.

[30] For information regarding Cygnaeus's work I am indebted largely to A. Panthier, *Enquête Historique sur L'Enseignement Manuel* (Paris, 1906), pp. 81-85.

[31] Otto Salomon, "Sloyd in the Service of the School," *Art and Industry*, Vol. 2, pp 873-878.

[32] Salomon in the Forty-sixth Report of the Massachusetts

these industries against the severe competition of the factories, a course of training in handwork was planned, which was introduced ultimately into the public schools. An institution for the development of this system of training in the Swedish home industries was founded at Naas through the liberality of a wealthy merchant, August Abrahamson. The school was placed in charge of Otto Salomon, a nephew of the donor.[33]

During the year 1877 Salomon visited Finland and met Cygnaeus, the founder of the Finnish school system.[34] He was much impressed by his presentation of Froebel's views on the educational influence of handwork, and from about this time began to pay special attention to the development of the sloyd system so as to accomplish purely educational rather than economic ends.

During the eighties the system began to attract general attention in England and the United States. The earliest account of it to be published in America is contained in the Forty-sixth Annual Report of the Massachusetts Board of Education, issued in 1883. The interest it aroused was due in part to its apparent freedom from some of the cardinal defects of the Russian plan of tool instruction, in part, also, to the fact that being a practical application of Froebelian principles it was well adapted to serve in the elementary and higher grades as

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Board of Education; Gustof Larsson, "The Origin and History of Sloyd in Sweden," *Proceedings of the American Manual Training Association*, 1897, p. 7.

[33] Another cause of economic decline was the spread of habits of intoxication among the peasantry due to the legalization of the manufacture of alcoholic liquors by individuals.

[34] On the growth of sloyd see B. B. Hoffman, *The Sloyd System*, pp. 235-242.

a continuation of the handwork of the kindergarten.[35]

But, as has already been said, the medium through which Froebel's influence has been brought to bear most powerfully and directly upon the development of manual and industrial school education in America is the kindergarten. The earliest American kindergartens, those conducted in German by Miss Frankenberg and others in the thirties, forties, and fifties do not seem to have taken root. An American kindergarten for English-speaking children was established in Boston by Elizabeth Peabody in 1860. Another was organized as part of the school system of St. Louis in 1873. Boston followed in 1877, and Cincinnati and Chicago in 1879.

An interesting attempt to modify the exercises of the kindergarten so as to make them contribute more directly to training in the industrial arts was made by Miss Emily Huntington in New York, in 1876.[36] The spheres, cubes, and other mathematical forms which make up Froebel's gifts were replaced by small models of various household utensils. Through plays and exercises with these the children were instructed and trained in sweeping, laundry work, serving a dinner, etc. The idea soon attracted popular attention. The institution was burdened with the inappropriate name of "Kitchen Garden," presumably in a laudable attempt to show its relation to the kindergarten, on the one hand, and its character as an elementary domestic training school, on the other.

[35] *Addresses and Proceedings of the National Educational Association*, 1889, pp 626-627; 1893, p. 597; 1894, p. 878; 1896, p. 765.

[36] *Cf.* Emily Huntington, *The Kitchen Garden* (New York, 1878); See also account of exhibit in *Minutes of the Thirty-seventh Annual Meeting of the New York State Teachers' Association*, Yonkers, July, 1882.

Kitchen gardens were established in Boston, Philadelphia, Cincinnati, Chicago, and elsewhere. In some instances, as in Cincinnati, the work was expanded into something resembling a regular school course in domestic science.[37] In 1880 the New York Kitchen Garden Association was organized. Four years later the association dissolved. Its members immediately reorganized, however, as the Industrial Education Association of New York City.[38]

A similar institution known as the "Farm Garden" was established in the early eighties, to do for agriculture what the Kitchen Garden was trying to do for domestic economy.[39]

Meanwhile the regular kindergartens were leading the way in the deliberate and systematic training of the hand as a means of general education. Their example soon began to influence the work of the public school. Manual occupations were introduced into the primary grades and thence into the higher grades.

In the Workingman's School of New York we have an interesting example of an institution originating as a kindergarten and developing into a school for older children, and providing in each successive grade as it was added the manual and industrial work suited to the needs and capacities of the children.[40] In his first report, the Principal says:[41]

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[37] *Art and Industry*, Vol. 2, pp. 327-329.

[38] *Ibid.*, pp 256-265. [39] *Ibid*, p 260.

[40] Felix Adler, "A New Experiment in Education," in *Second and Third Annual Reports of the Workingmen's School*, New York, 1881-1883, pp. 9-20; also George Ricks, *Hand-and-Eye Training, Being a Development of the Kindergarten for Junior and Senior Scholars* (London, Cassell & Co., 1889).

[41] *Art and Industry*, Vol. 2, p. 483.

We begin industrial instruction at the earliest age possible. Already in our own kindergarten we lay the foundation for the system of work instruction that is to follow. In the school proper, then, we seek to bridge over the interval lying between the preparatory kindergarten training and the specialized instruction of the technical school, utilizing the school age itself for the development of industrial ability.

Marenholtz-Bülow

Froebel's efforts on behalf of the incorporation of handwork into the educational program have been powerfully supplemented by his disciples. One of the most influential of these, the Baroness von Marenholtz-Bülow, makes a vigorous plea on behalf of manual and industrial education in her pamphlet entitled "Work and the New Education According to Froebel." Like Ruskin and Morris, she dwells on the necessity of elevating the lives of the masses through making the daily labor of the workingman serve as an exercise for the mind as well as the body. This, she believes, can be brought about best through habituating the individual from early childhood to the association of mental with manual activity. Hence the importance of handwork in the kindergarten and throughout the regular school course.[42]

Daniel Georgens

Another earnest and persistent attempt to extend the handwork of the kindergarten into the regular school was made by Dr. Daniel Georgens. Although a firm believer in the principles on which kindergarten work is based he did not hesitate to point out its imperfections. Cer-

[42] Bertha von Marenholtz-Bulow, *Die Arbeit und die neue Erziehung nach Froebels Methode* (Berlin, 1866).

tain of the exercises devised by Froebel were, he believed, better suited to the children of the elementary and intermediate grades than to those of the kindergarten. They should be assigned to these, along with other forms of handwork, for [43]

> the principle on which the kindergarten is based, namely, that the need for movement, for impression and expression, the impulse to know and to do, must be gratified and harmoniously developed through appropriate and interrelated activities, this principle is general and valid beyond the limits of the kindergarten, it is a law which must govern the education of the school as well as that of the kindergarten.

Hence handwork is to be one of the chief means of education employed in the common school. It is introduced, however, as a means of cultural rather than of vocational education. The manual occupations of the school are divided by Georgens into garden work and form work. Both are related as intimately as possible to the more purely intellectual subjects. Garden work affords occasion for instruction in geometry, arithmetic, physics, meteorology, agricultural chemistry, and natural history. The form work is carried on solely as a means of expression and representation. It consists in the Froebelian occupations in the laying of splints, rings, and tablets, in drawing, weaving, modeling with clay, wire, or pasteboard.

The school education of the masses is to be rounded out not in the general school but in the apprentice school. Here much time is to be devoted to handwork, but for vocational rather than for cultural ends. Such an in-

[43] Daniel Georgens, *Der Arbeitsunterricht in der Volksschule*, p. 8.

stitution has become necessary, in Georgens' opinion, owing to the increasing inadequacy of the apprenticeship system. The principal studies of the common school course, the mother tongue, geography, arithmetic, drawing, and modeling are to be continued, especial attention being given to their practical applications. This vocational training is to be supplemented by instruction and training in the duties of citizenship.[44]

Johann Friedrich Herbart

The importance which Herbart attaches to ideas as factors determining the character of the will led him naturally to lay much less emphasis upon handwork as a means of education, than did Froebel.[45] He does not, however, altogether ignore it. He recognizes, for instance, certain points of superiority which the industrial occupations possess as means of education. In his *Outlines of Educational Doctrine,* he writes:[46]

> Every growing boy and youth should learn to handle the ordinary tools of the carpenter as well as the rule and the compasses. Mechanical skill would often prove far more useful than gymnastic exercises. The former benefits the mind, the latter benefit the body. With burgher schools should go manual training schools, which does not mean that the latter must necessarily be trade schools. Finally, every human being ought to learn how to use his hands The hand has a place of honor beside language in elevating mankind above the brute.

Herbart's point of view, however, is not such as to favor any extensive utilization of handwork in the educational

[44] *Ibid.*, pp. 91-96

[45] F H. Hayward, *The Meaning of Education in Herbart* (London, 1907), pp. 160-161.

[46] J. F. Herbart, *Outlines of Educational Doctrine* (New York, 1909), p. 260.

process. In consequence his references to the subject, though not infrequent, are usually vague and incidental in character.[47]

Tuiskon Ziller

More importance is attached to handwork by certain of Herbart's disciples. Ziller, for instance, gives it a definite place in his Herbartian system of education. He values it chiefly, however, as a means of attaining merely practical ends and only secondarily as a means of moral education. He recognizes the fact that the training and instruction afforded by the common school program do not prepare adequately for industrial life. To remedy this he recommends that the teacher, as soon as the pupil begins to manifest interest in the selection of a vocation, should foster this interest, and, after the pupil has reached a decision, should give him every opportunity to translate his intentions into action. For character is always the outgrowth of action and it is desirable that it should develop under the control and with the assistance of systematic education rather than that it should be left to chance.[48] These demands can be met only through a course of instruction which shall relate directly to the future occupation of the pupil. This vocational preparation should be afforded, however, Ziller believes, not as part of the regular liberal course of study but should be pursued as a subordinate educa-

[47] Illustrated by the passages laboriously collected by Teuscher and Franke in *Quellen zur Geschichte der Arbeitsschule* (Leipzig, 1913), pp. 133-144 *Cf.* Sir Philip Magnus, *Educational Aims and Efforts*, pp. 176-179.

[48] Tuiskon Ziller, *Grundlegung zur Lehre vom erziehenden Unterricht* (Leipzig, 1865), p. 116; quoted in Rissmann, *op. cit.*, p. 66.

tional aim in special vocational schools or in a course of apprenticeship. Children of the laboring classes should begin at about the age of ten to devote four or five hours a week to this purpose. Those of the middle and upper classes should take up the work somewhat later.[49] In the technical exercises of these supplementary schools nothing more is attempted than to prepare for subsequent vocational training. The course should be broad and varied. Simple exercises are well adapted to this purpose. As preparation for some handicrafts, for instance, exercises in the use of the lathe, hammer, saw, plane, auger, and file would be suitable.

Ernst Barth

Another eminent Herbartian, Ernst Barth, considers handwork as not only a propædeutic to vocational training but also as an indispensable part of general education. Manual or industrial training, he contends, is at the same time observational training of the most intensive kind.[50]

> A boy who has to model an apple in clay will fix in his mind its shape, the elevations on its surface produced by its seed capsules, much more permanently than any one who draws it or merely looks at it. Moreover, through continued employment with these materials he will acquire an amount of information concerning their nature . . . such as a year of observation would not afford him.

Industrial instruction for purposes of general education should, Barth believes, be as closely related as possible to the other subjects of the curriculum. He and

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[49] Ziller, *Grundlegung*, etc., p. 108; quoted in Rissmann, *op. cit.*, p. 66.

[50] Barth-Niederley, *Die Schulwerkstatt.*

his coadjutor, Niederley, succeeded in incorporating an extensive series of manual occupations in an Herbartian course of study and in intimately correlating the two. The elementary, or fairy-tale class, represent in drawings or models the different objects mentioned in the stories told them, such as windowpanes, chairs, tables, doors, houses, wheels, and pumps.[51] Similarly the Robinson Crusoe, Patriarch, Homer, Herodotus, Livy and other classes represent in drawings or in constructions of clay, wood, pasteboard, or gypsum the objects brought to their attention in their studies. They make also many articles of school equipment such as penholders, mathematical models, cabinets, book covers, and portfolios.[52]

Erasmus Schwab

A new wave of interest and activity in industrial and manual education dates from the publication by Erasmus Schwab, in 1873, of a book entitled *The Work School as an Organic Part of the Folk School.* The inadequacy of the existing folk school, the author maintains, is revealed in the fact that "the majority of men to-day are either superficial or confused in their thinking or are unwilling to think at all. They have no opinions of their own, are slow in making a decision, unpractical, deficient in energy and, only too frequently, afraid of work."[53] These defects arise, he asserts, from the failure of the schools to lead the pupil to acquire clear ideas. The cure which he prescribes is the utilization in school education of work in the shop and garden. Knowledge

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[51] *Ibid*, pp 115-116. [52] *Ibid.*, pp. 20-26.

[53] Erasmus Schwab, *Die Arbeitsschule*, etc. (Wien, 1873); quoted in Rissmann, *op. cit.*, pp. 71-73.

acquired in connection with handwork will, he declares, be vivid, interesting, and permanent to a degree unknown in conventional systems of education.

A pamphlet on the school garden, published by Schwab in 1870, aroused widespread interest in the utilization of gardens in school education. It was translated into several European languages and was an important factor in bringing about the remarkable extension of school-garden work throughout the Austrian empire in the seventies. By 1879 no less than 220 school gardens had been established in Silesia alone.

Summarizing the benefits accruing from the employment of handwork as a means of general education, Schwab claims that: (1) It exercises not simply the child's impulses toward activity but stimulates his powers of invention and affords scope for the development and expression of individuality. (2) It reveals the relative capacity of pupils. This is manifest in their work. There is no room for envy or jealousy. The praise of the teacher is superfluous. (3) It promotes cooperation, for, owing to the fact just mentioned, the less gifted pupils are more willing to submit to instruction by their fellows in the work school than in the ordinary school. (4) Handwork renders education more natural and healthful.

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CHAPTER VIII

THE INDUSTRIAL REVOLUTION II

Summary—In the struggle for commercial and industrial supremacy, intensified by the Industrial Revolution, France, Germany, and other continental countries gave especial attention to providing for their artisans school training in industrial art, and in other features of the technique of the manufacturing process.

Urged on by repeated demonstrations in successive world's fairs and in the markets of the world, of the superiority of school methods of industrial education, both the English Government and English trade corporations began to make more adequate provision for the education of all classes of industrial workers both through the establishment of industrial and technical schools and colleges and through the support and encouragement of education in industrial subjects in common and other schools.

Under the pressure of ever-increasing international competition, Massachusetts in 1870 followed the example of England, France, and other countries in providing by law for the industrial art training of the working classes, both in common and in special schools.

This legislation marks the beginning of the adaptation of the American public school program to the vocational needs of the industrial classes.

International Competition and Industrial Education in England

Just as the Industrial Revolution has differentiated those employed in the industries into two classes, the

workingmen or operatives, on the one hand, and the organizing, administrative, and capitalistic class on the other, so it has given rise to two fairly distinct movements for the promotion of industrial education. The earlier of these dates from the beginning of the nineteenth century and aimed primarily at the elevation of the condition of the workingman through adult education, largely in the liberal, but to some extent, also, in the industrial arts and sciences. Supported mainly by philanthropists and organizations of workingmen, the movement has made only relatively slight contributions to the establishment of existing institutions for school education in the industries. An account of this movement has been given in Chapter V.

The later movement, which was well under way only in the second half of the century, aimed primarily at the improvement and extension of commerce and industry. By the middle of the century the enormous increase in production resulting from the development of the factory system, the improvements in means of transportation, the widening of markets, together with the increasing dependence of the laboring classes upon the maintenance of the manufacturing industries, intensified the contest among the leading nations for industrial and commercial supremacy and made the support of industry and commerce more and more a leading object of governmental policy. Prominent among the means employed to this end was the encouragement of technical and industrial education.

The initiative in this seems to have been taken by the peoples of continental Europe.[1] These lacking the ad-

[1] Report of United States Commissioner of Education, 1892-

vantages which England possessed in her vast and conveniently located deposits of coal and iron and in her half century of almost undisturbed monopoly of the great labor-saving inventions which had revolutionized industry, sought to increase the quality and quantity of their output through a more accurate adjustment of their system of industrial education to the new conditions.[2]

> The rivals we have raised up to our trade [says an English writer of the sixties] . . . have employed as the most powerful instruments of rivalry, a national system of science and trade education, such as we have scarcely conceived, much less brought into general use.[3]

The Royal Commission was especially impressed with the attention paid by France and some of her neighbors to the training of the working classes in industrial art.

> The crowded schools of drawing, modeling, carving, and painting, maintained at the expense of the municipalities of Paris, Lyons, Brussels, and other cities—absolutely gratuitous, and open to all comers, well-lighted, furnished with the best models, and under the care of teachers full of enthusiasm—stimulate those manufactures and crafts in which the fine arts play a prominent part to a degree which is without parallel in this country.[4]

It was not, however, merely in art that France was providing her industrial workers with supplementary

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1893, p. 187; K. A. Schmid, *Geschichte der Erziehung*, Vol. 5, No. 3, p. 293.

[2] Second Report, Royal Commission on Technical Instruction, Vol. I, pp. 507-508. *Cf.* Alonzo Potter, *Principles of Science* (Boston, 1841), p. 399.

[3] J. Scott Russell, *Systematic Technical Education* (London, 1869), p. 5; Report of Commission on Education, 1877, pp 16-19.

[4] Second Report, Royal Commission on Technical Instruction, Vol. I, p. 511.

instruction and training. A great variety of both cultural and vocational training was offered in evening schools and courses of lectures. Not only the municipalities but the state and associations of private individuals, such as the Polytechnic Society, the Industrial Society of Amiens, and the Rhone Society for Professional Instruction, contributed to the support of this work. In fact, the Royal Commission reports that:[5]

> The system of evening instruction is one of the most striking features of the present condition of educational effort in France. The walls of the public buildings of Paris as well as those of every French town which the Commissioners visited were largely placarded with the announcements of evening lectures and classes both for men and women.

Nevertheless, more complete systems of industrial education had been built up in Germany. The comparatively small state of Württemberg, for instance, had not only its Polytechnic University at Stuttgart, but also its School for the Building Trades,

> designed to help . . . stonemasons, bricklayers and carpenters to be trained for future master-builders; lower class builders to be trained for master-builders, constructors of public works, etc. . . . The general workmen whose education it undertakes are plasterers, tilers, roofers, joiners, carpenters, glaziers, turners, decorators, ornament-sculptors, modelers, engravers, smiths, gold and silver workers, gardeners, and husbandmen.[6]

In addition it had in the sixties 108 higher trade schools.

To provide her industrial classes with like educational advantages England would have to establish 11 endowed

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[5] *Ibid*, Vol. I, p. 29.

[6] J. Scott Russell, *Systematic Technical Education* (London, 1869), p. 5.

technical universities, 11 building trade schools, and 1,180 higher trade schools.[7]

Positive evidence of the advantages which states like Württemberg were deriving from school systems of industrial and technical education was afforded, many Englishmen believed, in the successive international exhibitions dating from about the middle of the century. In more than one instance the influence of these great world's fairs is clearly traceable in legislative provision for technical and industrial school education.

The London Universal Exhibition of 1851, which drew attention to the beauty of French wares in finish and design, was followed in England by the creation of the Department of Science and Art in 1853. This reorganization of the government art department marks the beginning of industrial art training in the public elementary schools. The three principal objects of the new department, as stated in the minute, are: (*a*) the promotion of elementary instruction in drawing and modeling; (*b*) special instruction in the knowledge and practice of ornamental art; (*c*) the practical application of such knowledge to the improvement of manufactures.[8]

The international exhibitions of 1862 and 1867 seemed to many to afford further evidence of the decline of English manufactures owing to failure to follow the example of the Germans and others in providing adequate school training in the industries. Referring to the latter, J. Scott Russell, in a plea for further provision for industrial and technical education, writes: "We then

[7] *Ibid.*, pp. 30-31.

[8] Isaac Clark, "Education in the Industrial and Fine Arts in the United States," *Art and Industry*, Part I, p. 726. *Cf.* Thirty-fifth Report of Massachusetts Board of Education, 1872, p. 13.

learnt, not that we were equalled but that we were beaten, not on some points, but by some nation or other, on nearly all those points on which we had prided ourselves."[9]

The Exposition Universelle of 1878 still further increased the alarm of the English over the backward condition of their industries and led to the appointment in 1880 of the Second Royal Commission on Technical Instruction,

> to inquire into the Instruction of the Industrial Classes of certain Foreign Countries in technical and other subjects, for the purpose of comparison with that of the corresponding classes in this country; and into the influence of such Instruction on manufacturing and other Industries at home and abroad.[10]

The investigations conducted by the Commission led it to recommend, among other things, that "in the proposed reorganization of local government, power should be given to important local bodies like the proposed County Boards and the municipal corporations to originate and support secondary and technical schools."[11]

The details of this recommendation are reflected in subsequent legislation with remarkable faithfulness. In 1887 the Act for Technical Schools in Scotland was passed. The Local Government Act of the following year prepared the way for the Technical Instruction Act of 1889, which allowed the newly organized county and

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[9] J. Scott Russell, *Systematic Technical Education*, p. 86.

[10] Second Report, Royal Commission on Technical Instruction, Vol. I, p. 14. Walter Smith, however, finds in this Exposition reason for encouragement. See Smith, "Industrial Education and Drawing as Its Basis," address before Massachusetts Teachers' Association, 1878, p. 9.

[11] *Ibid.*, p. 517.

borough councils to levy a rate of not more than a penny in the pound for the support of technical or manual school training. Few, however, of the local authorities availed themselves of this privilege and little in this direction would have been accomplished had it not been for the Local Taxation (Customs and Excise) Act of the following year which placed in the hands of each council for the support of technical schools a large sum of money derived from the proceeds of the liquor tax. The funds made available in this way for the support of industrial and technical education amounted in 1900-1901 to more than four million dollars.[12]

The above recommendation by the commission of "secondary" as well as "technical" education is significant. In her competition with other industrial nations England found herself at a disadvantage, not only because of her lack of a well-ordered system of technical and industrial schools for different classes of industrial workers, but also because her inadequate system of common school education left many workingmen unprepared to avail themselves of industrial and technical school work. Just here, as has already been noted, lay the chief cause of the failure of the Mechanics' Institutes as centers for technical and industrial training.[13] Realizing these facts it is not surprising that the Commission should declare that "the best preparation for technical study is a good modern secondary school."[14] Here also we may find an explanation of the fact that, when finally a considerable

[12] Graham Balfour, *op cit.*, pp 165-168.

[13] See Ch. v, p. 70; also Acland and Smith, *Studies in Secondary Education* (London, 1892), pp. 8-12.

[14] Second Report, Royal Commission on Technical Instruction, Vol. I, p. 516.

fund for "technical instruction" had been provided, the latter should be so defined as to include instruction in practically every subject of the secondary school program except the classics,[15] "ranging from modern languages, music, commercial grammar, literature, and composition to boot-clicking, bricklaying, and plasterers' work."[16]

The large sum appropriated for technical instruction in England in 1890 became available for that purpose through unforeseen circumstances. It had been raised to compensate publicans who were to be deprived of their licenses. The withdrawal of the licenses, however, did not take place and Parliament was left with the funds to dispose of. Under these circumstances it was persuaded to appropriate them for the support of technical instruction.

Other large sources of income for industrial and technical instruction had already become available in a somewhat similar manner. There was, for instance, the diversion to this end of the property of numerous anachronistic charitable endowments. The proceeds of many of these in London were being misappropriated, having become no longer applicable to the purpose for which the endowment had been established. To correct the abuse the City Parochial Charities Act was passed in 1883. A popular novel, Besant's *All Sorts and Conditions of Men,* had during the preceding year drawn general attention to the lack of provision for wholesome recreation or of supplementary instruction and training for the working population of London. The money made

[15] Graham Balfour, *op. cit.*, pp. 166-167.
[16] *Ibid.*, p. 166, note.

available through the Charities Act was to be applied to meet this need through the founding of a number of institutions called "Polytechnics," modeled to some extent after the "Regent Street Polytechnic," an institution which afforded recreation and instruction to the laboring classes. One of the functions of the Polytechnic is to supply "instructions in the general rules and principles of the arts and sciences applicable to any handicraft, trade, or business." [17]

Another agency through which the wealth of ancient foundations is directed to the support of technical and industrial education is the City and Guilds of London Institute, organized in the late seventies by the Livery Companies of London, "for the purpose of providing and encouraging education adapted to the requirements of all classes of persons engaged or preparing to engage, in manufacturing and other industries." In the pursuit of these aims it has founded and maintained technical and industrial schools and colleges, has contributed towards the erection and maintenance of others and has, through the establishment of examinations, certificates, and prizes, done much to promote the extension of technical and industrial education throughout the country.

Important contributions were made also by individual guilds. The Clothworkers' Company of London, for instance, not only erected the buildings for the textile and dyeing departments of Yorkshire College, but endowed it with a grant of 1,250 pounds a year for five years and renewable under certain conditions. At the same time it "generously supported" the weaving department in

[17] Sidney Webb, *London Education* (London, 1904), p. 149.

the Trade and Grammar School at Keighley, contributing, in addition, 1,000 pounds for building extension.[18]

The Promotion of Commerce and Industry as a Motive for the State Support of Industrial School Education in the United States

In the United States, as in Europe, the Industrial Revolution created a demand for the reorganization of public education so as to make it more directly contributory to the progress of industry and commerce. As early as 1826 Lieutenant-Governor Tallmadge of New York asserts that:[19]

> It seems very necessary that those sciences essential to the prosperity of manufacturing industry should be especially promoted, and adapted to the comprehension of a meritorious class of citizens, whose situation and circumstances, while they deny them the opportunities of an academic life, devote them more assiduously to mechanical pursuits, and perhaps as certainly prepare them to advance the public good.

During the thirties Henry Barnard delivered at various places a lecture on industrial education in which he not only gave manufacturers timely warning of the necessity of making better provision for industrial education but also recommended to this end the introduction of drawing into the public schools, thus outlining a course of action closely similar to that which the manufacturers of Massachusetts were impelled to follow some forty years later.[20]

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[18] Second Report, Royal Commission on Technical Instruction, Vol. I, pp 465, 473.

[19] Franklin B Hough, *Historical and Statistical Record of the University of New York*, p. 260.

[20] Isaac Clarke, *op. cit.*, Vol. I, pp. 8-9. See also Barnard's

International rivalry appears definitely as a factor in the movement for industrial education in an address delivered in Baltimore in 1851 by William Minifie, a leading art instructor there. He ascribes the success of the French textile exhibits at the London Universal Exhibition of that year to the training, mentioned above, which they provide in art and design for their working classes.[21]

> Let us ask an intelligent drygoods merchant where those beautifully flowered silks or chintzes are manufactured; he will tell you, in France. Ask him why those French goods fetch better prices, and are in greater demand than American or English goods of equal texture; he will tell you it is because of the superior beauty of the designs, and the harmonious blending or contrasting of the color. Ask him why this is so; he will tell you that the government of France has established in Paris, and in all her manufacturing towns, national schools of design, where a course of drawing is taught, as well as the study of the laws of harmonious coloring. And this is true. France is indebted for her superiority in these and many other manufactures, to her completely educated draughtsmen, emanating from her schools of design.

The conditions referred to by Barnard and Minifie were those which later actually brought about the introduction of industrial art training into the schools of Massachusetts and thus inaugurated the era of industrial and vocational education in American public schools.

The merchants and manufacturers of Massachusetts,

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recommendations to the General Assembly of Rhode Island, November, 1845, quoted by Guy F. Wells—*Educational Review*, September, 1915, pp. 171-173.

[21] Isaac Clarke, *op. cit.*, p. 426. For recognition of drawing as part of industrial education, see recommendations of State Superintendents Carr and Wickersham, Report of the United States Commissioner of Education, 1877, pp. 15, 214.

recognizing the advantages accruing to Europe from the provision there made for school education in the industrial arts, petitioned the legislature in 1870 to establish special industrial art schools and to make drawing a required study in all the public schools of the state. The petition states that owing to the lack of industrial art training in this country, "our manufacturers compete under disadvantage with the manufacturers of Europe, for in all the manufacturing countries of Europe free provision is made for instructing workmen of all classes in drawing." [22]

In compliance with this petition the legislature passed in the same year An Act Relating to Free Instruction in Drawing. The first section placed drawing among the subjects required to be taught in the public schools. The second section provided for free instruction in industrial art in special schools. It reads:

> Any city or town may, and any city or town having more than 10,000 inhabitants shall, annually make provision for giving free instruction in industrial or mechanical drawing to persons over fifteen years of age, either in day or evening schools, under the direction of the school committee.[23]

To promote the efficient execution of the purpose of the act Walter Smith, an eminent English teacher, was appointed to the post of state supervisor of drawing.

Other states soon followed the example set by Massa-

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[22] Isaac Clarke, *op. cit.*, Vol. 1, p. 52. *Cf.* Thirty-sixth Report of Massachusetts Board of Education, p. 192.

[23] *Ibid.*, p 40. International competition for the markets of the world has always been a powerful factor contributing to the vocational education movement. See pp. 165, 206, also Fifth Annual Report of the Federal Board for Vocational Education, 1921, pp. 18-19.

chusetts. The annual report for 1870 of the State Superintendent of Public Instruction in Maine strongly recommends the introduction of drawing into the public school and mainly for industrial and commercial reasons. In the following year the legislature passed an act permitting any city or town to provide free instruction in industrial or mechanical drawing to persons over fifteen years of age. An act of the New York Legislature in 1875 required instruction in industrial and free-hand drawing to be given in normal schools and in city public schools. In some of the latter the subject had already been introduced.[24]

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PART II

INDUSTRIAL EDUCATION IN THE UNITED STATES

CHAPTER IX

INDUSTRIAL EDUCATION DURING THE PERIOD PRECEDING THE CIVIL WAR

Summary.—Legislative provision for industrial education in the colonial period relates to the apprenticeship system and follows for the most part the example of England.

Isolated examples of school education in the industries occur toward the close of the eighteenth century.

B. G. Du Pont, in his scheme for national education in the United States, drawn up in 1800 at the request of Jefferson, urges the peculiar importance of school education in the industries under the conditions prevailing in this country at that time.

Certain institutions, affording a quasi-industrial education, such as the Mechanics' Institute and the "Fellenberg" or Manual Labor schools were introduced into this country in the twenties from Europe.

The late twenties is a period remarkably prolific of educational schemes involving more or less education in handwork.

About the middle of the century there develops a popular movement for the employment of public funds to provide a school education that would both promote skill and intelligence in the occupations of the majority of the people, the mechanical industries and agriculture, and would at the same time utilize these as a means of liberal education. The agitation issued in the Land Grant Act of 1862 which provided for the establishment in the different states, respectively, of one or more colleges of agriculture and the mechanic arts.

Provision for Industrial Education Reflecting European Influence

What little attention was paid in this country during the colonial period to the theory and practice of indus-

trial education seems to have owed its stimulus not merely to local conditions but to the example set by the mother country. The industrial education provided for by the Massachusetts Ordinance of 1642,[1] by the Virginia Statute of 1646,[2] by Penn's Frame of Government of 1682,[3] and by the legislation of 1676 for the Duke of York's American possessions [4] was that not of the schools, but of the apprenticeship system and was but an adaptation to colonial conditions of customs and laws with which the colonists had become familiar in England. It has already been pointed out that such plans as that of President Hoar for a workshop at Harvard in 1672 or of Thomas Budd [5] for an industrial high school in New Jersey in 1685 were but side currents of the great movement for realistic and industrial education then running its course in England and on the Continent.

In a few instances handwork seems to have been actually introduced into American schools and colleges of the eighteenth century. In Cokesbury College at Abingdon, Maryland, for example, it was a recognized form of recreation. "The interval till seven was allowed for receation; such as gardening, walking, riding, and bathing; and within doors the carpenters', joiners', cabinet-makers', and turners' business." [6] Writing in 1837,

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[1] Records of Massachusetts, Vol. II, p. 8.

[2] William W. Hening, *Statutes at Large, Laws of Virginia*, Vol. I, p. 336.

[3] Lyman P. Powell, *History of Education in Delaware* (Washington, 1893), p. 28. James P Wickersham, *History of Education in Pennsylvania* (Lancaster, 1886), p. 33.

[4] Wickersham, *Ibid.*

[5] Thomas Budd, *Good Order Established in Pennsylvania and New Jersey in America* (London, 1677).

[6] *American Quarterly Register*, Vol. 4, p. 20. Cokesbury Col-

John I. Hawkins, an English civil engineer and a pioneer advocate of industrial school education, says:[7]

> Nearly forty years ago, in the hope of setting an example and of proving the utility and practicability of uniting study with as much useful manual labor as would keep the body in health, I took a workshop adjoining an academy at Bristol in Pennsylvania in the United States of America and undertook, for a moderate remuneration, to instruct any students a few hours each day in the practical use of tools employed in various kinds of manufactures.

The interesting scheme of education for the people of the United States drawn up in 1800 by the French statesman and economist, Du Pont, at the request of Jefferson, recognizes, after the manner of Rousseau, the importance of manual activity in education. "He [the child] has an urgent desire to move, to act, to accomplish. . . . He has never learned anything except by struggling, running, touching, constructing."[8] Actual handwork with tools is recommended, however, only as one of various forms of occupation for hours of leisure.

> Many while exercising their bodies will acquire information as useful to their minds as that which they learn in class. Some of them will learn to handle the saw, the plane, the scraper, the chisel, the gouge, the hammer, the file; we will permit the use of these tools in our recreation room and each pupil shall have his own place to be used as a workshop or laboratory.[9]

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lege, the earliest Methodist College, was founded about 1785 and was closed, apparently, in 1795.

[7] *A Prospectus of The Polytechnic University* (London, 1837).

[8] Du Pont de Nemours, *National Education* (Newark, Delaware, 1923), p. 6.

[9] *Ibid.*, p. 87.

Nevetheless the principles of the mechanic arts should be widely taught. "In America where country dwellings are isolated, it is important that the principles of mechanic arts should be widely taught, and that each family should have at least one well-informed member; for a trained mechanic is not always within reach."[10]

Throughout much of the nineteenth century European and especially English influence continues to be a dominant factor in determining the character of the provision made in this country for systematic education in the industries. The Mechanics' Institute, introduced in 1824, had been developing in England for two or three decades as an institution for providing adult workmen with an education at least in part technical and industrial. The American institutions of this class show, however, some slight deviations from the English type. The earliest, the Franklin Institute of Philadelphia, aims not only at "the delivery of lectures on the arts and the application of science to them and . . . holding exhibitions of American manufactures and awarding medals to worthy workmen," but also at "the establishment of schools in which should be taught architecture and mechanical drawing, chemistry applied to the arts, and mechanics."[11] Some of the American institutes seem, moreover, to have provided a more practical education than did the English. Hudson, in his *History of Adult Education*, says:[12]

The perfect Mechanics' Institution can only be found in the Western World, for in nc part of Europe can a people's in-

[10] *Ibid.*, p. 21.

[11] *Philadelphia Public Ledger* (October 23, 1873). Quoted in *Art and Industry*, Vol. 3, pp. 9-10.

[12] P. 216.

stitute be seen in which a machine shop supplied with the necessary mechanical tools for the diligent and for inventors, is accessible to all.

In America, as in England, certain mechanics' institutes have maintained their existence up to the present and have developed wholly, or in part, into technical or trade schools.[13] The great majority of the institutes have here, however, as in England, died out.

An indication of the increasing influence of peculiarly American conditions was the organization in this country about 1826 of the American Lyceum. Though suggested by the Mechanics' Institute, it was planned to meet the educational needs, vocational as well as cultural, of a far larger section of the population.[14] It aimed, among other things, "to apply the sciences and the various branches of education to the domestic and useful arts and to all the common purposes of life."[15] Designed to meet the educational needs, not only of artisans, but also of the agricultural classes, and to accomplish for each of these a multiplicity of aims, educational and otherwise, its influence in maintaining the cause of industrial education seems to have been decidedly inferior to that of its prototype, the mechanics' institute.

In the twenties and thirties Fellenberg's contributions to the European movement for the industrial education of the poor began to exert a marked influence upon

[13] *E g.*, The Ohio Mechanics' Institute and the Maryland Institute for the Promotion of the Mechanic Arts. Out of the Manchester Mechanics' Institution developed the Manchester Technical School. *Cf.* Second Report, Royal Commission on Technical Instruction, Vol. I, p. 432.

[14] *Cf. North American Review*, July, 1826, p. 63.

[15] *American Journal of Education*, October, 1826, p. 395.

educational theory and practice in this country. His famous institution at Hofwyl was visited by numerous travelers from this side of the Atlantic who kept their countrymen well informed as to the work of the Swiss reformer. Fellenberg's plan of combining hand labor with learning was adopted in this country both in public charitable institutions for the young,[16] and in the American Manual Labor Schools, or Fellenberg Schools, as they were sometimes called.

Occasionally the proposal was made that these last-named institutions should be used for extending among the poorer classes the opportunity for vocational as well as liberal education. The Painters' Society of New York, for instance, urged in 1830, in an official communication to the Association for the Protection of Industry and the Promotion of National Education,

> that the state should furnish throughout the land at public expense state institutions where every young citizen should be educated . . . and where each should obtain (beside the various branches of a liberal education) a competent knowledge of at least one trade or occupation by which even while completing his education he may earn his living.[17]

Only in a few instances, however, do the aims of the manual labor schools seem to have been to any noteworthy extent vocational.[18]

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[16] John Griscom, *Memoir of John Griscom.*

[17] "The Free Enquirer," January 9, 1830; quoted in Carlton, *Economic Influences on Education*, etc, pp. 76-77.

[18] Sec. 10 of the Pennsylvania common school law of 1834 provides that school directors "shall have power to purchase materials and employ artisans for the instruction of the pupils in the useful branches of the mechanic arts." James Wickersham, *History of Education in Pennsylvania*, p. 480.

Early American Experiments

The Gardiner Lyceum.—The growing recognition during this period of the necessity of providing for more thorough and systematic industrial education is reflected in various experiments in organizing schools for that purpose. As early as 1822 the Gardiner Lyceum is established at Gardiner, Maine, "for the purpose of giving to farmers and mechanics such a scientific education as would enable them to become skillful in their professions."[19] It aimed, further, to instruct students "practically as well as theoretically."[20]

The Rensselaer School.—Two years later the Rensselaer School was founded at Troy, New York. The aim of the institution was not only to train students in the application of the principles of science to agriculture and the mechanic arts, but to fit them to impart this knowledge and skill to others. After having completed an extremely practical course in which, among other things, they were required to "observe the operations of a select number of agriculturists and artists in the vicinity of said school, and to demonstrate the principles upon which the results of such operations depend,"[21] they, or, at least, some of them, were to be sent out as

teachers for instructing youth in villages and common school districts, belonging to the class of farmers and mechanics, by

[19] *Quarterly Register of American Education Society*, Vol. 2, p 63. *American Journal of Education*, Vol 2, p. 216.

[20] *American Journal of Education* (1827), pp. 412-422.

[21] *Ibid.* For further evidence of the movement for industrial education, see *American Annals of Education*, Vol. 1, pp. 124-125; *American Journal of Education*, Vol. 1, pp. 86-95; *National Intelligencer*, 1824, January 17, 29, 31, February 3; *North American Review*, April, 1826, Vol. 22, pp. 452-453.

lectures or otherwise, in the application of the most important principles of experimental chemistry, natural philosophy, and practical mathematics to agriculture, domestic economy, the arts, and manufactures.

In a report issued in 1828 the Regents of the University of the State of New York say:

> The sciences taught in the Rensselaer School are immediately connected with agriculture and arts and are considered indispensable to the successful prosecution of the great branches of manufacturing labor in wool, cotton, and iron, which the nation has embarked in and upon the success of which the prosperity of our state is materially involved.

Maclure's Experiments at New Harmony.—A similar enterprise, but one which afforded pupils more direct training in industrial occupations, was undertaken a year or two later in the New Harmony community in Indiana by William Maclure, the eminent philanthropist, scientist, and social reformer. To the infant and higher schools modeled after those founded by his partner, Robert Owen, and by the Swiss reformer, Pestalozzi, he added an industrial school. In the latter practical training was afforded in taxidermy, printing and engraving, drawing, carpentry, wheelwrighting, wood-turning, blacksmithing, cabinetmaking, hat making, shoemaking, agriculture, washing, cooking, sewing, housekeeping, dressmaking, and millinery. Each pupil in the higher school (for pupils from five to twelve) was required to learn at least one trade either in the shops or on the farm attached to the industrial school.[22]

[22] George B. Lockwood, *The New Harmony Movement* (New York, 1905), pp. 233-243. See Robert Dale Owen's discussion of relation of the New Harmony Experiment to the Industrial Revolution in his *Threading My Way*, pp. 245-258.

After the collapse of the New Harmony community in 1827 Maclure made various other attempts to establish school education in the industries upon an enduring foundation. During the same year he announced the establishment of Maclure's Seminary and of the Orphans' Manual Training School. In 1828 he founded in New Harmony a School of Industry, also The Society for Mutual Instruction.

The institution first mentioned, Maclure's Seminary, embodied certain features of the then new and much discussed manual labor school in that it aimed to enable students to support themselves through their industrial occupations. The announcement of the school reads:

> Young men and women are received without any expense to themselves, either for teaching or for food, lodging, and clothing. . . . The scholars rise at five; at half-past five each goes to his occupation; at seven the bell rings for breakfast; at eight they return to work; at eleven their lessons begin; continuing until half-past two, including half an hour for luncheon; then they return to their occupation until five, when a bell calls them to dinner. Afterwards until half-past six they exercise themselves in various ways; then the evening lessons begin and last until eight. The basis of the institution is that the scholars repay their expenses from the proceeds of their seven hours' labor, but to effect this will require several years more.[23]

One of Maclure's numerous schemes was that of introducing the industries into the common schools as a means not only of fitting the pupils for useful occupations but also of defraying the expense of the school through the products of their labor.

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[23] Lockwood, *op. cit*, p 254.

That children by their own labor can clothe and feed themselves is completely proven in other countries and will be very soon in this . . . after which it will be easy for the inhabitants of any district to subscribe and buy a farm; each lending a hand to erect buildings and begin the cultivation which will secure a useful education to their children with food and clothing.[24]

Other Representative Plans of the Twenties and Thirties for Combining Labor and Learning.—The third and fourth decades of the nineteenth century are remarkably fertile in plans for associating manual labor with the regular activities of the school. While some of these, as has just been shown, were actually carried out, many of them were never put to the test of actual experiment. The number and character of the latter, however, serve to throw light on the trend of educational thought. They reflect not only the manual labor movement, at that time in full career, but also a growing conviction of the value of systematic industrial training as a part of both vocational and liberal education.

About 1826, Professor John Griscom, who like Maclure had visited Fellenberg's schools at Hofwyl, proposed to introduce industrial training into his recently established high school in the city of New York; for purposes of recreation and cultural education, however, rather than for vocational training. In his first announcement, after referring to some proposed provision for gymnastic training, he continues:[25]

A still more interesting branch of manual exercise is that . . . in the easier parts of carpentry, joinery, casting, turning,

[24] William Maclure, *Views and Opinions*, etc. (New Harmony, 1831), p. 70.

[25] *American Journal of Education* (1826), pp. 28-29.

etc. We contend for the advantage of employing boys in employments of this nature for . . . every hour spent in the use of tools will add something to that stock of information which may enlarge their sphere of future usefulness. . . . As soon as a subscription list will enable us . . . we shall erect a series of shops . . . procure tools and employ a workman to superintend the exercises.

Captain Partridge, who had recently removed his famous military school to Middletown, Connecticut, suggests in the same year that to each school "should be attached a range of mechanics' shops, where those who possess an aptitude and inclination might occasionally employ a leisure hour in learning the use of tools and acquiring a knowledge of some useful mechanic art."[26]

At about the same time John B. Yates was maturing his plans for establishing, in connection with his group of factories, shops, and mills at Chittenango, New York, a higher institution of learning which was to afford practical and technical as well as literary training. Work on the farms and in the mills and shops was to be carried on by the students while pursuing courses of study in agriculture, the natural sciences, etc, in the schools. Yates' application to the New York Legislature in 1830 for financial support for the "Polytechny," as the institution was to be called, proved unsuccessful and the scheme was abandoned.[27]

It was only a year or two later that a volume of lectures on education appeared, which proposed a plan for

[26] *Ibid.*, p. 400.

[27] Franklin B. Hough, *Record of the University of the State of New York*, pp 731-732 A trade school at Franklin, New Hampshire, in 1823, is mentioned by George G. Bush, *History of Education in New Hampshire*, pp. 41-42.

the education of the children of the entire country in centralized schools. In connection with each school, extensive shops were to be erected.

> In this Mechanical Department, various kinds of work should be operated; such as plainjoiner's and carpenter's work, cabinet work, carved work, chair-making, etc.; by which labor each student, after he has arrived at sufficient age, shall be able to earn something towards defraying the expenses of his academic course.[28]

One aim of this department was to equip each child for useful and remunerative work in some manual occupation.[29]

The Attitude of Representative Men of the Period

Proposals and enterprises such as those just described were quite in harmony with the views of many of the leading public men and educators of the time. Lieutenant-Governor Tallmadge's statement in 1826 as to the necessity of providing, through industrial education, for the adaptation of the workingman to the conditions brought about in America by the Industrial Revolution has already been quoted.[30]

In 1831 Governor Throop of Maine publicly recommends that some attention be given to agriculture and the industries in common schools.

> I feel confident that under proper regulations a vast amount of knowledge in arts and sciences, connected with agriculture and handicraft, which are simple in their principles, and easily comprehended, might be taught to children during those years which are usually spent at common schools.[31]

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[28] George Brewster, *Lectures on Education* (Columbus, Ohio, 1833), p. 114. [29] *Ibid*, pp. 115-117. [30] See p. 129.
[31] *American Annals of Education*, Vol. 1, p. 125.

In a prize essay published under the auspices of the American Institution of Instruction during the following year, the author, William A. Alcott, states that he

> cannot help anticipating a period when every common school will have the means of attending to agricultural or mechanical pursuits more or less every day and be furnished with all the necessary implements, made of proper size for the smaller as well as the larger pupils.[32]

Similar views had been expressed some four years earlier by the New York Public School Society. In its address of 1828, the society urged that "schools should be provided with such means of instruction as are best calculated to fit their pupils for the various departments of mechanic, mercantile, and agricultural industry." [33]

Provision for the education of the young in the industries, agricultural and mechanical, is urged by Alonzo Potter in 1842 in *The School,* a work written for and widely read by "teachers, employers, trustees, inspectors, etc., of common schools." He says:

> Adaptation to the future condition and pursuits of a child . . . ought to characterize our system of instruction and training . . . In a nation where the vast proportion of the people must be employed in husbandry . . . a taste for horticulture, and for the beautiful and picturesque in nature; some knowledge of the principles of rural economy . . . ought to be instilled into the minds of children. . . . It would be well also if some knowledge of the first principles of science to the other industrial arts were generally cultivated among the young; that thus they might not only be better prepared for the life of a mechanic or artisan, but might be accustomed to

[32] American Institute of Instruction Lectures, etc. (1832), p. 253.

[33] W. O. Bourne, *History of the Public School Society,* pp. 115-116.

regard all these pursuits of industry in their connection with science and liberal studies.[34]

The character and importance of this early nineteenth century movement for industrial education in the public schools may be estimated also from the opposition which it aroused. In an address delivered before the Western Literary Institute and College of Professional Teachers in 1835, Mr. A. Kinmont, a brilliant educational leader of the time, vigorously opposed the movement to introduce vocational training into the public school.

So far as the education of the school is concerned, it seems to me better, at least up to the age of fifteen or sixteen, that the teacher should not know even for what function in life the pupil is intended, and it is certainly desirable that the destination of the youth should not be fixed at that early age. . . . It is easy to see that it ought to be the object of a school education, which runs on from seven or ten to fifteen or sixteen, to teach not the technical points of any trade or profession . . . to wield the hammer of the blacksmith or the trowel of the bricklayer, that is useful and practical education, nobody denies it—I detract not a particle from its dignity, but rather support it—but confident I am that to teach such things, however honorable or however useful, is not the design of a school education; what then? to teach what all men should know, and what it is honorable and right and useful and indispensable that all men should (in the view of civilization) know.[35]

The Land Grant Act of 1862

During the last two or three decades of the period preceding the Civil War the growing influence of the

[34] Alonzo Potter, *The School* (New York, 1842), pp 56-57.

[35] Western Literary Institute, Transactions of the Fifth Meeting, p. 109.

pioneer population of the West, and other conditions contributing to the growth of the American spirit of independence and democracy, gave rise to a movement for the democratization of higher education which issued in the passing of the Land Grant Act of 1862, a measure the influence of which on industrial education has been both profound and far-reaching.

Successive appropriations by the federal government to the states of funds available for the support of public education gave rise, especially in the intensely democratic frontier states of the West, to a demand that the education thus provided should be suited to the needs of the mass of the people, the mechanics and farmers, rather than, as hitherto, to those of a relatively small professional or leisure class.[36]

What seems to have been the most vigorous and best organized popular movement in this direction was that which ran its course in Illinois, mainly in the fifties. The existence of a relatively large state fund available for purposes of higher education stimulated a popular movement to apply it so as to meet directly the needs of the working classes rather than of those already well provided for in existing types of educational institutions. At a convention of farmers assembled in Granville, Illinois, in 1851 "to take into consideration the best interests of those engaged in agriculture," Professor J. B. Turner, the leading spirit in this movement for democratic education, presented the following resolution: "That we take immediate measures for the establishment

[36] For a clear statement of this view, see James Tallmadge, "Address at the Close of the Twenty-third Annual Fair of the American Institute" (New York, 1850), p. 11.

of a university in the state of Illinois expressly to meet those felt wants of each and all the industrial classes of our state."

The meeting at Granville proved to be the first of five Industrial Education Conventions the work of which attracted attention throughout the country.[37]

The second convention expressed itself in a memorial to the legislature as favoring an appeal to Congress "for an appropriation of public lands for each state in the Union for the appropriate endowment of universities for the liberal education of the industrial classes in their several pursuits in each state of the Union."[38]

At the third of these conventions was organized the Industrial League of Illinois, consisting of

> such only of the inhabitants of the state of Illinois as desire that when this state seminary is established it shall be . . . designed to furnish to the great industrial classes of the state, our farmers, merchants, and mechanics, each in their own sphere, the same thorough, liberal and practical education in those various sciences underlying their several pursuits, and in all processes, principles, and arts connected therewith, as our colleges and professional schools now afford to their students of theology, medicine, law, and the art of war.

The work of the fourth convention, held in Chicago in 1853, is especially notable in that it definitely proposed the plan later realized through the passage by Congress in 1862 of the Morrill or Land Grant Act, according to which large grants of land were made to the different states for the endowment of agricultural and mechanical

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[37] Edmund J. James, *The Origin of the Land Grant Act of 1862*, pp. 102-105.

[38] W. L. Pillsbury, in Report of the Superintendent of Education, Illinois, 1885-1886, p. clxxvii.

colleges. The resolutions presented to Congress at the request of this convention are in part as follows:

Whereas a state system of Industrial Universities, liberally endowed in each state of the union, coöperative with each other and with the Smithsonian Institute at Washington, would develop a more liberal and practical education among the people, tend to more intellectualize the rising generation and eminently conduce to the virtue, intelligence and true glory of our common country; therefore be it

Resolved by the House of Representatives, the Senate concurring herein, that our Senators in Congress be instructed, and our Representatives be requested, to use their best exertions to secure the passage of a law of Congress donating to each state in the union an amount of public lands not less in value than five hundred thousand dollars, for the liberal endowment of a system of Industrial Universities, one in each state of the union, to coöperate with each other and with the Smithsonian Institute at Washington, for the more liberal and practical education of our industrial classes and their teachers. . . .

The presentation of this memorial in Congress was supported by a vigorous and systematic campaign of publicity on the part of Professor Turner and other members of the Industrial League of Illinois.[39] In 1857, Senator Justin S. Morrill of Vermont introduced a bill making grants of land to each of the states for the endowment of agricultural and mechanical colleges. The bill, after having passed both houses, was vetoed by President Buchanan in 1859. Introduced again, it was once more passed and received the signature of President Lincoln in 1862.

[39] Edmund J. James, *op. cit.*, p. 32 *Cf.* Report of the Superintendent of Public Instruction, Illinois, 1885-1886, pp. clxix-clxxxv.

The act granted to the several states an amount of public land equal to thirty thousand acres for each senator and representative in Congress. The money derived from the sale of these lands was to be appropriated

> to the endowment, support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

Another industrial education movement contributing to the passage of the Land Grant Act began in New York about 1850. Harrison Howard, a member of the Mechanics' Mutual Protection Society, succeeded in arousing interest in a project for the establishment of a school for the education of mechanics, among a number of prominent public men, such as Horace Greeley, the editor of the *New York Tribune*, Washington Hunt, later governor of the state, and T. C. Peters, editor of the *Woolgrower*. In June, 1850, Greeley wrote an extended editorial on "A Mechanics' University." Peters urged upon the mechanics and farmers of the state the importance of combining in an effort to secure the establishment of an educational institution suited to their peculiar needs. In 1851 such an association was formed and a prospectus, drawn up by Greeley and Peters, was widely distributed. It outlined in a general way a plan for a "People's College," which was to teach the sciences related to agriculture and the mechanic arts. In this

institution, students, while they were to have an opportunity to select from a rather extended list of subjects, were to be required to become proficient either in agriculture or in some branch of manufacturing or mechanical industry.

In 1853 a charter for such an institution was secured, but it was not before 1858 that the erection of buildings was begun at Havana, New York.[40] Reverend Amos Brown, appointed president of the college in the same year, was one of the most active in promoting the passage of the Land Grant Act.[41]

The industrial education movement of the fifties was foreshadowed in Pennsylvania in the establishment, by James Gowen at Germantown in 1847, of a school for practical farmers which was conducted successfully for several years. In 1853 the Pennsylvania Agricultural Society, convened to consider the subject, recommended the founding of a school for the education of farmers. A charter for the school was obtained from the legislature the following year. It stated the purpose of the institution as "the education of youth in the various branches of science, learning, and practical agriculture as they are connected with each other." Founded as the Farmer's High School, its name was changed in 1862 to The Agricultural College of Pennsylvania. In the following year it was designated by the legislature to receive the income of the Land Grant for Agricultural and Mechanical Colleges.[42] In 1874 the institution was

[40] Sidney Sherwood, *History of Higher Education in New York* (Washington, 1900), pp 320-321.

[41] Isaac E. Clarke, *Art and Industry*, Vol. 4, pp. 843-848.

[42] James Wickersham, *History of Education in Pennsylvania* (Lancaster, 1886), pp. 432-433.

given the name it now bears, Pennsylvania State College.

This support for education in agriculture and the mechanic arts has since been extended to all the states of the Union. The capital provided by the federal government for this purpose amounted, in 1914, to $13,621,-712.97. Each state now applies the whole of the income derived by it from this fund to the support of one or more agricultural and mechanical colleges. By the Second Morrill Act of 1890 and the Nelson Amendment of 1907 the original grant has been supplemented by an appropriation of $50,000 a year to each state, also to the insular possessions, Hawaii and Porto Rico.

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CHAPTER X

THE INTRODUCTION OF INDUSTRIAL EDUCATION INTO THE AMERICAN COMMON SCHOOL

Summary.—Industrial education in the form of industrial drawing was introduced by law into the public schools of Massachusetts in 1870. One great obstacle to the introduction of actual work with tools was the lack of an effective and economical method.

Colleges of engineering which were under pressure to provide practical training in the use of tools and machinery for their students were in the early seventies in eager search of such a method. In the Russian exhibit at the Centennial in 1876 was discovered what was believed to be the long-sought method. Not only was it at once introduced into colleges of mechanical engineering, but it was promptly adopted by those who were seeking to employ handwork in the schools as a means of liberal culture. A school organized to this end by the head of the Polytechnic at Washington University became the prototype of a new kind of secondary school, the manual training high school. Many schools of this type were established in the eighties and nineties.

Meanwhile, the development of the kindergarten in this country was giving a powerful impetus to the movement for school education in the industries. An association, formed in the city of New York for the support of a practical kind of kindergarten work, reorganized in 1885 as the Industrial Education Association of New York City. Its success in persuading schools to introduce industrial education created a demand for industrial teachers, which it met by establishing what later became Teachers College of Columbia University. This has continued to be, up to the present, one of the most

influential centers for the promotion of industrial education.

At the same time, various others factors were operating to accelerate the movement for industrial education—the extension of school education through compulsory education laws, the successful employment by Séguin of hand training in the education of the feeble-minded, and the continued progress of the Industrial Revolution.

The attitude of the teachers of the country toward the movement gradually changes from comparative indifference to that of active support.

The Introduction of Drawing as the Initial Step

In the sixties and seventies, as has already been shown,[1] American merchants and manufacturers were led, under the pressure of keen international competition, to advocate a more direct training of the young for industrial life in the public schools. To this end, following the example of England, industrial drawing was introduced into the schools of Massachusetts and of other states. Industrial drawing, however, though helpful, was not sufficient. It owed its early introduction rather to its practicability as a school subject than to its intrinsic importance.[2]

The Search for a School System of Industrial Training

The most important feature of industrial training is the direct cultivation of skill in the use of tools. For this, however, no efficient system of school instruction had yet been found. The need for such a system was felt with especial urgency in colleges of mechanical en-

[1] See pp. 130-131.

[2] I am not unmindful of the fact that the cultivation of artistic taste and skill in the workman was the chief aim proposed for public school work in drawing. *Cf.* pp. 124, 130.

gineering, because their graduates, for want of skill in the actual handling of tools and machinery, were being obliged to supplement their protracted course of academic training with months or even years of apprenticeship in order to fit themselves for directive positions in manufacturing plants.[3]

The problem, though formidable, did not seem incapable of solution. A similar difficulty in the teaching of the sciences had been overcome through the use of the laboratory method of instruction. Hence it seemed not unreasonable to expect that in some of the technical schools throughout the world there would be discovered a system by which adequate training in the use of tools might be afforded during a regular college course without detracting from the thoroughness of the work done in the subjects already taught.[4] It was in the hope of finding such a system set forth in the exhibit of some engineering school that President Runkle, of the Massachusetts Institute of Technology, visited the Centennial in 1876.[5] He was not disappointed. Just such a system as he was looking for he found presented in the exhibit of the Imperial Technical School of Moscow. It had been worked out for the most part by its director, Della-Vos,

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[3] See John D. Runkle in *Conference on Manual Training* (Boston, 1891), pp. 133-134. Edward Atkinson, "Memorial to Committee on Prisons of Massachusetts Legislature," December, 1879, "Instruction in the Mechanical Arts," p. 2 *Cf* "Discussion of Technical Education at Meeting of Mining Engineers" (Easton, 1877), p. 19.

[4] President Runkle formulates the question thus: "Can shopwork instruction be devised of sufficient range and quality, which will not consume more time than ought to be spared from the indispensable studies?" "The Russian System of Shopwork for Engineers and Mechanics" (Boston, 1876), Report to Corporation of Massachusetts Institute of Technology. [5] *Ibid.*, p. 5.

as a substitute for an apprenticeship system, which an experience of two or three decades had shown to be inefficient and expensive.

Essential Features of the Russian System

The new plan was, in brief, that of analyzing workshop operations into their elementary processes,[6] of arranging these in a graduated series and making them the object of systematic drill by the student. Della-Vos informs us that he aimed at a course of tool training that would stand in the same relation to regular shopwork as that in which the finger exercises and studies of the piano student stand to the rendering of music on the piano. He sought a course which would impart the requisite knowledge and training in the least possible time, a course "which would make the instruction progressive, should facilitate the supervision of large numbers of pupils and should impart to mechanic art teaching the character of a sound and systematic acquisition of knowledge." An essential feature of the plan was the sharp distinction drawn between instruction and construction. The exercises were devised solely with the former end in view, no attempt being made at the "construction" of articles of use or beauty. In an address before the New England Cotton Manufacturers' Association, Runkle, in one of the clearest of his characterizations of the system, said:

[6] For instance, to quote Runkle, "It is found that the forger's art is substantially included in the six following elements: First, the management of the fire and the degrees of heat; second, bending without changing the cross section of the bar; third, drawing down or reducing the cross section; fourth, increasing its cross section; fifth, welding; sixth, hardening and tempering." *Cf.* Pestalozzi's method as described above, p. 90.

Russia, for the first time, has built up a school for instruction—not construction, but instruction—in the use of tools. We think that they make this instruction just as systematic as our instruction is in mathematics, chemistry, drawing, or any other subject. The instruction is given to classes.[7]

The system, Runkle pointed out, did not train to the mastery of any particular trade—this he believed impracticable—but rather it cultivated skill in "the elements which underlie all industrial pursuits."

Adoption of the Russian System

It is this which made the Russian system valuable, in the opinion of its earliest American sponsors, as a feature not only of the professional training of engineers, but also of the general education of the non-technical school. Runkle's Report to the Corporation of the Massachusetts Institute of Technology on the Russian System of Shopwork[8] led to its adoption and to the establishment of a School of the Mechanic Arts,[9]

in which special prominence is given to handwork in connection with high school studies. . . . The object is not to fit the pupil for a particular trade, but to develop the bodily and

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[7] *Proceedings of the New England Manufacturers' Association*, October 27, 1876, pp. 11-12.

[8] Boston, 1876.

[9] *Cf.* Samuel C. Brown, "A Series of Centennial Suggestions Based Upon Foreign Methods" (Trenton, 1878), pp. 38-43.

The school owed its establishment to a generous appropriation from the Massachusetts Charitable Mechanics' Association and to private subscriptions. See Annals of Massachusetts Charitable Mechanics' Association (Boston, 1892), p. 226, and Report of Fifteenth Exhibition of Massachusetts Charitable Mechanics' Association (Boston, 1884), p. xx.

mental powers in harmony with each other, and with reference to the actual wants of life.[10]

It is scarcely necessary to say that the need of hand-work instruction in general education had long been recognized. A powerful plea for its introduction into the public schools of Massachusetts had been made four years before by Lizzie S. Batchelder.[11] Only the previous year a subcommittee of the Boston School Committee had recommended "that his Honor, the Mayor, be requested to petition the next legislature for authority to introduce industrial education into the schools." An actual beginning had been made in a small way with the establishment of the Whittling School, supported by the Boston Industrial Education Association.[12] The "Report on a Developing School" by a Committee of the American Social Science Association[13] indicates a considerable body of opinion favorable to industrial

[10] The course of study drawn up for this earliest of American "manual training" schools is as follows:

First Year	Exercises	Hours per Week	Second Year	Exercises	Hours per Week
1 Shop Instruction	120	12	1 Shop Instruction	120	12
2 Algebra, 1st half	45	3	2 Algebra, 1st half	45	3
Plane Geometry, 2d half	45	3	Solid Geometry	45	3
3 Rhetoric and Composition	90	3	3 English Literature	60	2
4 Freehand Drawing ...	90	3	4 French	90	3
			5 Mechanical Drawing .	90	6

[11] Dr. L. Batchelder, "Plea before Committee on Education of Massachusetts Legislature" (Boston, 1872).

[12] Report of Rhode Island Committee on Education (Providence, 1877), pp. 28-29.

[13] Boston, Jan. 10, 1877.

education notwithstanding the impracticable character of the particular plan proposed.

It was Runkle's proclamation of his discovery of the Russian system and his plan for utilizing it not only in engineering but also in general education, which marks the beginning of the manual training movement, the first stage in a period of discussion and experimentation in educational handwork which is still running its course. The discovery of the Russian system making tool instruction practicable in school "caused new and profound attention to be given to the subject of our public education, raising the question whether it is not too objective to be most effective either as an end or as a means of preparation for the common duties of life."[14] In both the forty-first and the forty-fifth reports of the Massachusetts Board of Education, Runkle, responding to an invitation by the Board, presents arguments for incorporating tool instruction according to the Russian system into the program of our public and private schools. The new system is dwelt on at length in the Report of the Committee on Education of the Legislature of Rhode Island. Upon it they base their recommendation of the introduction into the public schools of "instruction in the mechanic arts in workshops, as a coördinate branch with the mental training in higher grades."[15]

St. Louis as a Center of the Movement

The center of the movement for manual and industrial education soon shifted, however, from conservative and

[14] John Runkle, "Fifteenth Exhibition of the Massachusetts Charitable Mechanics Association" (Boston, 1884), p. 20.

[15] Report of Committee on Education to Rhode Island House of Representatives (January, 1877), p. 36.

cautious New England to St. Louis in the Middle West. Here, at Washington University, experimentation in shopwork instruction had been carried on almost since the founding of the institution in the early sixties. The leader in this, Calvin M. Woodward, Professor of Mathematics and Mechanics and Dean of the Polytechnic School, derived fresh encouragement from Runkle's discovery. The Russian system was the "special inspiration" of an address [16] delivered by the former before the St. Louis Social Science Association, an address which led to the founding by certain business men of the St. Louis Manual Training School, the prototype of the class of schools still known by that name.

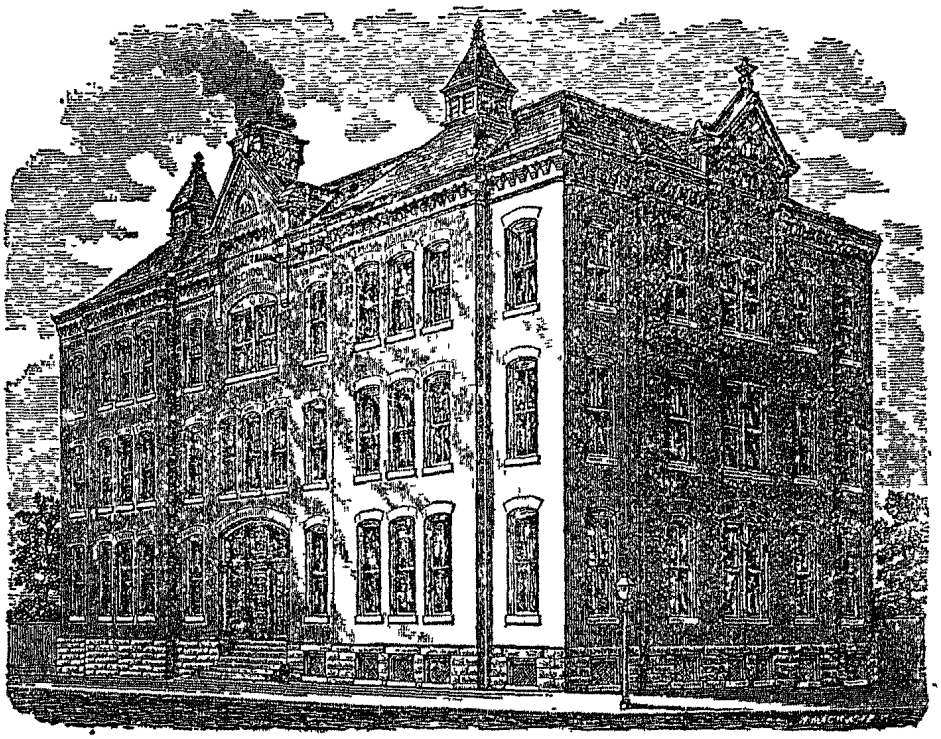
The motives actuating the different founders of this school seem to have been various, if not to some degree conflicting. Its financial supporters seem to have had in mind more efficient training for industrial life. Woodward's central idea seems to have been an institution utilizing logically organized and carefully graduated exercises in the use of tools as an important factor in general education. Common ground, however, was found in the conviction that the elaborately organized and formal training in the use of tools which Woodward recommended afforded a valuable preparation for all manual trades.

The Spread of the Manual Training Movement

The demonstrations which the school afforded its numerous visitors of orderly progressive instruction in the

[16] C. M. Woodward, "Manual Education," a paper read before the St. Louis Social Science Association (St. Louis, 1878), pp. 10, 20-23.

use of tools, and the continued agitation of the question of educational handwork in the press and on the platform by Runkle, Woodward, and others contributed to the establishment of manual training schools during the first half of the eighties in Chicago, Philadelphia, Cleveland, Toledo, and Baltimore. In all but the last mentioned of these cities the schools were established



THE MANUAL TRAINING SCHOOL OF WASHINGTON UNIVERSITY, 1879.

by private means, furnished, mainly, by wealthy business men desirous of promoting a more practical and efficient system of education.

The initiative in definitely incorporating manual training into the work of the public school was taken in the establishment of the Baltimore Public Manual Training School in 1883-1884.

The new system was adopted not only in special Manual Training Schools but also in schools of the older type. In Omaha, for instance,

> the high school was retained with all its features, a manual training department being simply added, the exercises of which all the high school pupils were permitted to attend. . . . A graduate from the Manual Training School attached to Washington University, St. Louis, was secured as teacher.

Popular interest in the system seemed to increase steadily throughout the eighties. It was adopted in reform schools.[17] One writer urged that annual payments of from fifty to three hundred dollars be made to needy students in order that all might avail themselves of the new manual training school education.[18] By 1891 a school subcommittee of Boston was able to report "all over our country, partly through private munificence and partly through public support, Manual Training High Schools have been established."[19]

The Aims of the Manual Training Movement

While there was naturally much that was vague and tentative in the reasons given for the introduction of tool instruction into general education, three or four stand out as fairly definite. First, it was held that by gratifying the constructive and creative impulses it supplied what had hitherto been a serious lack in general education. It made it possible, as Woodward expressed

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[17] *Cf.* William H. Letchworth, *Technological Training in Reform Schools* (Buffalo, 1884), pp. 42-48.

[18] Augustus Jacobson, *Higher Ground* (Chicago, 1888).

[19] Boston School Document, No. 1, 1891.

it, "to send the whole boy to school." Secondly, it seemed to make general school work more directly contributory to the training of the young for some form of manual industry. While the leaders, Runkle, Woodward, and others vigorously disavowed any intention of substituting vocational for cultural education,[20] they did not fail to point out that the manual training in the arts underlying the various handicrafts constituted a valuable though incomplete preparation for any form of skilled handwork.

It is this which accounts largely for the extent to which the manual training movement was promoted by business men. Not only did they provide the funds for the establishment of most of the earliest manual training schools, but through their representative, the National Board of Trade, they sent in 1877 a memorial to each of the state legislatures urging the establishment of schools

> where workmen and children may receive such technical instruction as will improve and create skilled labor, to the end that the poorer classes may become better fitted for a higher development of industry, and our mechanical and manufacturing interests be enabled more successfully to compete with those of other countries.

A third result looked for from the introduction of handwork into the schools was the cultivation of habits of industry. In the fourth place it was held that the recognition of the industrial occupations on the school

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[20] *Cf* John Runkle, "Report on Industrial Education" (Boston, no date [1892?]), pp. 7-8.

program would inculcate respect for manual labor and tend to elevate the social status of the working classes.

Other Factors Contributing to Its Growth

The discovery of the Russian system was, however, only one of several factors contributing to the promotion of school education in the industries during the eighth and ninth decades.

The Kindergarten.—The kindergarten was exerting a persistent and ever widening influence. There was a growing demand for the extension of its manual occupations up through the elementary school.[21] A committee of the New York Board of Education reports "the kindergarten although of widely different origin and purpose possesses close pedagogical relations to manual training." It recommends that its methods be continued upwards through the primary school.

The Workingman's School of New York, an experimental school which attained wide publicity through the papers and addresses of its director, Felix Adler, originated as a free kindergarten for the poor and continued the hand training through the higher grades successively added to it in the process of growth. In his report for 1881-1882 the director states:

> Evidence is accumulating . . . that a wider interest has been created in the objects to which we are devoted. The

[21] *Cf.* Report of Committee on Course of Study, New York Board of Education, 1887, pp. 5-6. Francis A. Walker, "Industrial Education," American Social Science Association, Sept. 9, 1884. Courtland Palmer, *The New Education* (New York, 1885), p. 15. Calvin M. Woodward, *Manual Education* (St. Louis, 1878), p. 30.

superintendents of various states and cities have written for detailed information concerning our school, with a view of introducing similar methods.

The Industrial Education Association and Teachers College.—The Kitchen Garden Association formed in 1880 to promote a modified form of kindergarten work, disbanded in 1884 in order to reorganize as the Industrial Education Association of New York City. The organization of this body is an event of prime importance in the history of industrial education in America. In the first place the association deliberately devoted itself to the application of kindergarten principles relating to hand training to the education of children of both sexes beyond the kindergarten age. "It is proposed to make this change because . . . it is desirable that industrial training for schools in general, for older pupils and for boys be added to the present work." [22]

In its Third Annual Report the association states that "the system which combines the industrial training with the usual and necessary branches is nothing more than a development of kindergarten theory." Secondly, it proposed to combine the kindergarten with the manual training and other systems of educational handwork. One of the reasons given for reorganization is that "other systems having been developed, it seems advisable to incorporate them with our own." [23] Thirdly, it devoted itself wholeheartedly to the task of introducing industrial [24] education into schools for the general education

[22] Fourth Annual Report of the New York Kitchen Garden Association

[23] *Ibid*

[24] In its Third Annual Report, the association points out that

of the young, not only in New York, but throughout the country. In its First Report the association states as one of its objects "to study and devise methods and systems of industrial education, and secure their introduction into schools." It applied itself in 1886 to the introduction of manual training into the schools of New York City, presenting a petition to the Board of Education and pointing out that "the introduction of manual training has already passed beyond the stage of experiment in neighboring cities."[25] Fourthly, the association undertook "to provide instructors for schools and classes, and, if necessary, to train teachers for this work."[26]

It is a curious fact that what is thus mentioned as a contingent activity has grown to overshadow all others. Out of it has developed the Teachers College of Columbia University, probably the largest and most influential of all institutions for the professional training of the teacher.

Already in its third year it became manifest that the association's success in promoting the introduction of industrial handwork into public and private schools "was creating a demand for trained teachers, to meet

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it uses the word "industrial" to designate an education not merely vocational but liberal as well, one "calculated to make better men and better citizens of the pupils, no matter what calling they may pursue"

[25] Manual training schools first mentioned at New York Board meeting, June 29, 1887. In 1888, $16,000 was appropriated for the work; in 1889, $25,000. A Manual Training High School and trade schools were recommended in 1900. In 1905, the plant of the Manual Training High School was used in the evening as a trade school.

[26] First Annual Report, New York Industrial Education Association.

which there was an inadequate supply."[27] The organization by the association of normal classes in an attempt to meet this demand soon made it evident "that such a scheme must assume the proportions of a training college, needing the guidance of a trained and expert educator."[28] Such an educator the association found in its president-elect, Nicholas Murray Butler, who was chosen to the presidency of the college as well as to the professorship of the history and institutes of education. Three other professorships were announced in the prospectus, one of mechanical drawing and woodworking, one of domestic science, and one of industrial art. A model school was instituted in connection with the college from the first. Its curriculum was that advocated by the parent Industrial Education Association for all grades. "Its lowest grade is a kindergarten, and in the primary and grammar grades manual training takes its place side by side with the three R's, and instruction in geography, history and elementary science."[29] Throughout the successive stages of its extraordinary growth Teachers College has remained true to the purposes of its founders.[30] It has throughout exerted a powerful influence in the promotion of manual and industrial training in the schools of the country. It has meant much for the cause of industrial education in this country that this great institution for the profes-

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[27] Third Annual Report of the Industrial Education Association, with prospectus of proposed Training College, April, 1887.

[28] *Ibid.*

[29] Dr. N. M. Butler. Address delivered at Baltimore, November 1, 1887.

[30] Perhaps no other institution is so completely equipped for the training of teachers of the industrial, domestic, and fine arts.

sional training of teachers should have owed its origin to an organization formed for "the creation of public interest and belief in the value of industrial education." [31]

In 1887 the College instituted courses of free public lectures, including several by the most eminent advocates of manual and industrial education. During the following year was begun the publication of a series of Educational Monographs written by leaders of educational thought, and treating, mainly, of industrial education.[32]

Coöperating with the factors which have just been discussed at some length were several others contributing to the rather rapid spread of school education in the industries during the eighties and nineties.

Extension of School Education.—Prominent among these was the extension of the privileges of free, common school education. As this brought the advantages of higher elementary and secondary education within the reach of larger and larger sections of the population, the proportion of those entering the manual occupations declined. Hence the complaints as to the scarcity of skilled workmen and the outcry against the schools as educating the young away from the trades.[33] As restriction of educational advantages would be repugnant to the spirit of our free institutions the only alternative was so to modify the character of the school course as

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[31] See statement of principles in Third Annual Report of the Industrial Education Association.

[32] *Monographs of the Industrial Education Association,* edited by Nicholas Murray Butler

[33] See, for example, Thirty-sixth Report of the Massachusetts Board of Education, 1871, p. 260.

to cause it to lead toward rather than away from the manual occupations. This could be brought about, it was commonly believed, through the introduction of manual and industrial training.[34]

The tendency to utilize manual occupations in school education was fostered further by the development of objective methods of instruction. In recommending industrial training for the Boston schools in his report for 1884-1885, Superintendent Seaver writes, for instance, "We may consider instruction in elementary bench and forge work as simply an extension of that object teaching which already characterizes the most interesting and profitable portions of our school work."

Séguin and "Physiological Education."—Further support was given the movement for manual and industrial training by certain discoveries in the anatomy and physiology of the nervous system. The localization of the motor areas in the brain and of the afferent and efferent elements of the nervous system seemed for a time to afford a sound scientific basis for the advocacy of hand training as a means of general education.

During the middle decades of the nineteenth century Edouard Séguin was maturing in connection with his epoch-making experiments in the education of idiots a conception of the ends and means of general education

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[34] The Committee on the Course of Study of the New York Board of Education, 1887, says, for instance: "It has long been a matter of deep regret, and even of apprehension, that a large proportion of our young people are growing up with a positive distaste for manual labor. . . . The introduction of manual training . . . has already begun to exert an influence toward bringing about a better state of things."

the full significance of which is perhaps not even yet recognized.[35]

A striking feature of his procedure with the idiot was his persistent and painstaking effort to lead the subject to use his hand, at first in the simplest way in grasping, then by carefully graduated steps, in more complex operations.[36] In this way he aimed to stimulate the lower nerve centers, and step by step, to bring the whole nervous system into functioning in a manner as nearly normal as possible. This deliberate and systematic stimulation of nerve centers, through exercising the appropriate organs, muscular, sensory or otherwise, was elaborated by Séguin into what he called the "natural" or "physiological" method of education. Its characteristic features are best described in his own words.[37]

> The physiological method trains the organs to educate their functions, and, conversely, exercises the functions to develop their organs. But whatever may be the gross proximate organs of our functions, these organs are subordinate to the nervous system; all actions being initiated or reflected by, or conveyed to, one of the nervous centers by nerve cords.

This conception of the nature of education demanded, of course, a reorganization of the school.

> The school must be organized, not to teach this or that, but to train the organs by the exercise of the functions; to develop

[35] It should be noted in this connection that two of the most stimulating of recent movements in education—the Montessori and the Nursery School movements—owe their inspiration, in part, to Séguin *Cf.* Margaret McMillan, *The Nursery School* (New York, 1921), pp. 12-14.

[36] Edouard Séguin, *Idiocy; And Its Treatment* (New York, 1866), pp. 110-118.

[37] Report on Education, Vienna International Exhibition, 1873 (Washington, 1875), pp. 23-24.

the functions by the exercise of the organs; to elevate the functions to the rank of capacities by their physiological training, and, above all, to keep all the while the balance between the forces acquired by good air, light, exercise, rest, etc., and the forces spent in centrifugal activity and in the centripetal operations of the senses and of the mind.[38]

In such a system of education, hand training holds naturally a place of great importance. This is indeed one of its chief distinguishing features.

It is unfortunately the fact that the hand has for years and ages struggled against matter to make it express or accomplish ideas, receiving all the while the least possible help from the mind. . . . But when physiological education prevails in the schools, then the hand will rule and the question will arise: The hand of which nation will be queen? Why should it not be that of America?[39]

This rather extended account of Séguin's views finds justification in the fact that they have quite recently contributed to the founding of two institutions distinguished both by the extent to which and the success with which they employ manual and industrial activities in the education of young children—the Montessori and the Nursery Schools.

He was by no means alone in his treatment of the subject of manual and industrial education from the physiological point of view. Professor, later President, D. C. Gilman, for instance, asserts, "The value of manual training as a method of improving the brain and nervous system, or, in other words, our thinking apparatus, must be acknowledged."[40] Similar views are

[38] *Ibid*, pp 113-114. [39] *Ibid.*, p. 114

[40] *Monographs of Industrial Education Association*, Vol. 1, No. 1, p. 11.

expressed by Crichton-Browne, John S. Clark, and others.[41]

The Progress of the Industrial Revolution.—Underlying all these factors, however, was the great revolutionary change going on in the system of manufacture. As one after another of the crafts, not only of the workshop, but of the household, was transferred to the machine and the factory where the old system of apprenticeship was, as a rule, no longer practicable, the need of providing for manual and industrial training not only in vocational but also in general schools was felt to become more and more urgent. The various reasons for this, several of which have been mentioned above, were kept constantly before the people by advocates of industrial education. Writing in 1881, Edward Atkinson says:[42]

> We are training no American craftsmen, and unless we devise better methods than the old and now obsolete apprentice system, much of the perfection of our almost automatic mechanism will have been achieved at the cost not only of the manual but also of the mental development of our men. Our almost automatic mills and machine shops will become mental stupefactories.

Trade Union Restrictions.—Even in those occupations not seriously affected by the factory system there was a decline of apprenticeship training due, it was charged, to the determination of the trade unions to restrict the

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[41] *Cf. Educational Monographs of New York College for Training of Teachers*, Vol. 3, p 170. John S. Clark, *Industrial Education* (Boston, 1883), p. 10. *Proceedings of National Education Association* (1892), p. 441, and (1895), pp. 731-732.

[42] *Scribner's Monthly*, April, 1881, p. 902.

supply of skilled labor. As early as 1875 we find the Cambridge School Committee declaring[43] that:

> The tyrannical and exclusive power of various trade unions . . . may . . . impose upon our school boards the duty of providing some mode or measure of industrial training for boys, at least so far as to give them a knowledge of the nature of materials, the use of common tools, and the management of simple machinery—all of which would be needless were the salutary practice of regular apprenticeship still in common use.

The Attitude of the Public School Teachers Toward Industrial Education.—In the later eighties the problem of manual and industrial training became a central subject of discussion among those interested in the cause of school education. The Report of the United States Commissioner of Education for 1887-1888 states that, "Not only in the educational but in the public press, in every educational meeting whether for discussion or for business no topic is more common than the subject of introducing manual training into the public schools." At the same time the teachers of the country, who had as a body by no means taken the initiative[44] in the industrial education movement, began to assume a more friendly attitude toward it. During the later eighties a noticeably more favorable reception was given by members of the National Education Association to addresses

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[43] Thirty-sixth Report of the Massachusetts Board of Education, 1875, p 118. The National Board of Trade, in its memorial addressed to the state legislatures in 1877, charges the scarcity of skilled labor both to the growth of the factory system and to the tyranny of trade unions. See Report of Rhode Island Committee on Education, Providence, 1877.

[44] Report of United States Commissioner of Education, 1893-1894, p. 898.

advocating the introduction of manual and industrial training into the public schools. Referring to the Chicago meeting of 1887 Dr. Woodward writes,[45] "For the first time it was felt that the vast membership of the association was friendly to the movement."

Notwithstanding, however, the growing unanimity of opinion as to the desirability of introducing hand training into the public school, the discussions of the time reveal an extraordinary variety of opinion as to the reasons for such introduction. Mr. W. Addis, of the United States Bureau of Education, in the report for 1887-1888, writes:

> To hear on the one hand a demand for manual labor because the youth who go from the schools are educated against it, and on the other a demand that it shall be introduced because ninety per cent of these follow a manual occupation, to hear on the one side a demand for manual training as a branch of education, and on the other as a branch of industry, and to find the whole subject obscured by a cloud of words, are of themselves quite sufficient to prevent any exertion on our part, either in the field of novelty or paradox.

In the next annual report he confesses that the Bureau of Education

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[45] In an address before the National Education Association in 1888, Dr. Belfield, a leader in the industrial education movement, said: "It may be of interest . . . to consider for a moment who advocate and who oppose manual training. While many of its friends are found in the teaching profession, the largest number of its earliest advocates were not, rather are not, teachers. . . . Teachers, generally, have been slow to appreciate this education. I well remember the large and enthusiastic gathering that greeted General Walker's address last July at Chicago; but I also remember the meetings at Saratoga . . . where the friends of manual training numbered a score, and its enemies a legion."

found itself in the singular position of having collected quite an array of statistics of a movement, the philosophy of which, as far as pedagogical features were involved, it did not understand. The publications of superintendents of systems by whom statistics have been furnished, were examined for light, but in vain, for there seemed no body of pedagogical principles that was common to all or even a majority.

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CHAPTER XI

EXPERIMENTATION IN HAND TRAINING

Summary—The Russian system revealed, under the test of actual practice, a serious defect. Work with tools which produced no object of use or beauty and which was performed merely for the sake of the skill to be acquired, proved to have little attraction for the average American youth. School handwork was threatened with decline.

Under these circumstances, the attention of American educators was directed to sloyd, a system of hand training which gratified more fully the child's creative impulses and which seemed in other respects better adjusted to the nature of the child. The system traced its origin on the one hand to the traditional domestic handwork of the Swedish peasant, on the other to the doctrines of Pestalozzi and Froebel, as interpreted and modified by Cygnaeus and a Swedish educator, Salomon.

The system has exerted an extraordinarily wide influence on school handwork throughout the civilized world. Its influence in the United States was extended through the establishment of a Sloyd Training School in Boston under Gustaf Larsson.

At about the same time, Charles Leland of Philadelphia was constructing a system of hand training closely correlated with art and nature study. It was based upon the conviction that the representation of natural objects and creation of articles of beauty in wood, brass, leather, and other materials were the kinds of handwork best adapted to the strength, the tastes, and abilities of the child, and possessed at the same time the highest cultural value. The ideas characteristic of these two movements, respectively, have become incorporated extensively in educational practice.

The increasing employment of handwork for purposes of cultural education is paralleled by the increasing use of the

hand as a means of acquiring knowledge in other fields of study.

The Two-Fold Aims of the Russian System

The Russian system had been adopted in this country, first, because it seemed to afford a solution of the problem of providing in college that part of the vocational training of the mechanical engineer involving the use of tools and machinery. At the same time it had been seized upon as a system which would make it practicable to give in school that training in the use of tools so long advocated as a most desirable if not essential feature of a well-rounded general education. While consistently advocating manual training as primarily cultural in its influence, its champions had not failed to point out its value as contributing to the vocational preparation of those who were to take up industrial occupations. Hence manual training or industrial education, as it was often called, had two fairly distinct aims; first, to supplement the traditional general school program in giving an all-round education, and secondly, to afford vocational preparation for industrial life.[1]

Notwithstanding vigorous opposition on the part of certain eminent educators,[2] general school education in the use of tools continued to spread throughout the country.[3]

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[1] Felix Adler, "A New Experiment in Education," Second and Third Annual Reports of the Workingman's School (New York, 1881-1883), pp. 10-12.

[2] *Cf* A. P. Marble, "The Unattainable in Education," National Education Association, 1880, pp. 38 ff. W. T. Harris, *Ibid.*, 1889, pp. 92-98. "Report on Value of Manual Training," *Ibid*, 1889, pp. 421-423. Walters, "Ways, Means and Maxims in Manual Training," 1889, p. 626. President Baker, *ibid.*, 1888, p. 173.

[3] *Cf.* Report of United States Commissioner of Education, 1899-

The Defects in the Russian System

It is a noteworthy fact, however, that while handwork has maintained its place in the general school program, the much vaunted Russian system, to which it owed its introduction, has not. Its merely formal exercises productive of objects neither of use nor of beauty seemed to the pupils to lead to nothing, and tended to become no less tedious than the formal exercises in arithmetic and grammar. The first school to adopt the Russian system in a program of general education, the School of Mechanic Arts in Boston, after a lingering existence [4] of a few years, ceased to exist altogether as a nonvocational school.[5] The first instructors in New England to test out the system thoroughly in private experimental schools were soon led to abandon at least some of the purely formal exercises in favor of work that would appeal more directly to the child's interests.[6]

The Origin and Development of Sloyd

It was under these conditions that there was brought to the attention of American educators the sloyd system of hand training which seemed free from these defects and which has since exercised a marked influence on manual school work throughout the civilized world.

1900, Vol. II, p. 2437. "There is a steady increase from year to year in the enrollment in the schools especially devoted to manual and industrial training."

[4] C M. Woodward, *Manual Education,* National Teachers' Association (Saratoga, 1882).

[5] Report of Massachusetts Committee on Manual Training and Industrial Education, 1893, p. 15.

[6] *Cf.* the work of Prof Frank Leavitt as described in Report of the Massachusetts Committee on Manual Training and Industrial Education, 1893, pp. 134-165.

The peasant class of the far northern countries of Europe had for centuries been accustomed to supplement their farm labors by various sorts of handicraft carried on in their homes during their long and dark winters. Thus training in the use of various tools early became part of the domestic education of the young, and thus, no doubt, was created an attitude toward the handicrafts which serves to explain the priority of the Finns and Scandinavians in the introduction of handwork into the school program.

The Finnish reformer, Cygnaeus, the originator of the earliest school system of manual training, though the son of a clergyman, had from his childhood followed with interest the various manual occupations usually practiced by the Finnish peasantry. Later, as chaplain at the Russian trading station of Sitka in Alaska, he was led (as was the American, Armstrong, in Hawaii) to recognize the importance of manual and industrial training in the education of primitive peoples.[7] The idea of introducing it into general education is said to have first occurred to him here. Some years afterward, while traveling as commissioner of the Finnish government to examine existing systems of education in western Europe, he was impressed by the importance attached to handwork in the systems of Pestalozzi and Froebel.[8] On his recommendation manual instruction was introduced into the program of the Teachers' Seminary at Jyvaskylä in 1861. Five years later it was introduced into the elementary schools of all rural Finland.

[7] A. Panthier, *Enquête historique sur l'enseignement manuel* (Paris, 1906), p. 81

[8] *Rheinsche Blatter fur Erziehung und Unterricht* (1882), Heft. III, pp. 195-204.

Though the handwork taught in the schools was largely that practiced by the peasants in their homes, he sought to realize by it the educational aims of Froebel, "The child ought to learn to realize for himself his own conceptions, he ought to be brought up from the beginning as a creator."[9]

In several other respects Cygnaeus laid down principles later adopted as fundamental in the sloyd system. For instance, his decision that handwork instruction should be given, not in special schools, but in the regular elementary school; that it should be obligatory in the primary school because of its capacity for developing the powers of mind and body at the same time; that the work should be given not by workingmen, but by professionally trained regular teachers. Only in this way would the manual work have the desired educational influence.

As for the content of the work, it should be, on the one hand, neither the systematic study of a trade, nor, on the other, should it be preoccupation with trifles. The occupations taught should be those ordinarily carried on within or around the house. It should involve the use of all the tools which the Finnish peasant ordinarily possesses.

It should include not only Froebel's gifts, but work suitable for older pupils and which may contribute to the training of the hand, to the development of the sense of form, to the cultivation of the æsthetic sense and to the acquisition by the pupils of a general skill useful in all the circumstances of life.[10]

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[9] *Ibid*, p. 199.

[10] A. Panthier, *Enquête historique sur l'enseignement manuel* (Paris, 1906), p 84.

The influence of Cygnaeus is to be traced in the regulation of the Finnish senate in 1866 in support of manual technical school work "which develops the spirit of observation, taste, address, love of work." The regulation made handwork obligatory in normal and in rural schools.

The innovation was, on the whole, successful. By 1880, on the occasion of the celebration of the seventieth anniversary of Cygnaeus' birth, there was not a single person to protest against the system. He received an ovation. The different Scandinavian countries likewise recognized him as a guide in all matters relating to educational handwork.

The introduction of handwork into the schools of Sweden was a result of attempts to withstand the steady deterioration of peasant home life. One of the causes of this was the gradual undermining of the peasant home industries or sloyd by the growth of the factory system.[11] To obviate this, systematic instruction in these industries was provided; this led to its introduction into the school:

Here, however, it underwent a complete transformation from a study pursued for economic ends to one pursued primarily for educational ends. The leader in this movement, Otto Salomon, at first a director of economic sloyd instruction, had gradually become more and more convinced of the value of handwork as a means of general education. In this view he was confirmed through his contact with Cygnaeus.

Salomon's achievements were made possible through

[11] Another cause is said to have been the absence of any restriction on the manufacture and sale of intoxicating liquors.

the generous financial support given to his work by his uncle, August Abrahamson. In the beautiful grounds of his uncle's estate at Nääs, formerly a royal hunting lodge, Salomon gradually worked out his improved system of educational sloyd. Here in 1875 a normal school for sloyd teachers was established. The progress of the new system is reflected in the attendance lists. The students increased from 4 in 1875 to 252 in 1904. From 29 in 1881, the attendance suddenly increased to 102 the following year.

Characteristic Features of Sloyd

Salomon familiarized himself with Cygnaeus's views and adopted his four principles mentioned above.[12] He goes beyond his predecessors, however, in emphasizing the cultural function of sloyd. Perhaps his greatest service is his adaptation of instruction and training in handwork to the conditions imposed by school organization. He graded the work and adapted it to the successive stages in the development of the pupil without giving to it the character of bleak formality which made the exercises of the Russian system so unattractive. Only objects of value for their usefulness or their beauty were prescribed.

Other noteworthy features of Swedish sloyd as developed by Salomon were individual instruction or instruction in very small classes, and the relatively small demand made upon the time of the pupil—two hours a week, of which half an hour was to be devoted to the cleaning and arrangement of tools.

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[12] Panthier, *op cit.*, p 97. Later, however, Salomon seemed inclined to make manual work elective, *ibid*, p. 112.

The Spread of Sloyd

The sloyd system was the first system of manual instruction and training to receive world-wide recognition. The students at Näas came from thirty-one different countries. Government commissions were sent from Germany, France, Belgium, Russia, Italy, Japan, the Argentine Republic, Chile, Uruguay, Brazil, Croatia, Roumania, Orange Free State, Hungary, Bulgaria, Ireland, Serbia, Egypt, Greece, and Siam. Books have been published in almost all languages and in practically all civilized countries to describe and propagate the system. Establishments have been erected throughout the world to apply the principles and even the special programs which have been promulgated at Näas. It was after a trip to Sweden that Salicis founded the manual training institution at Louis Thuillier Street in Paris. The same is true of the founding by the Italian, Consorti, of the Seminary of Ripatransone, the most celebrated and the most permanent of the sister institutions of Naäs. The achievements of the Swedish institution in the development of educational sloyd has led to its introduction into the United States, England, Holland, Russia, Japan and South America. It has even contributed to the development of other systems, for instance, that of Eva Rodhe, which employs kindergarten work for children up to five; light tool work for children from three to eight years; heavier tool work for children from eight to eleven; and the Naäs sloyd system for pupils from eleven to thirteen.

In brief, it is difficult to exaggerate the influence of sloyd in manual instruction. It has met with bitter

opposition, especially in England. Nevertheless, to it is due the honor of having raised manual instruction definitely above economic considerations, of having shown the necessity for careful organization, and of having brought the question of manual instruction to the front in countries hitherto indifferent.

Sloyd in the United States

The Swedish sloyd system was brought to the attention of American educators by Prof. John M. Ordway, for a time director of the School of Mechanic Arts at Boston, the pioneer "Russian system" school, founded by Runkle. Ordway's description of sloyd was published in 1883 in the *Annual Report of the Massachusetts Board of Education.*

Among the distinctive features of the new system, as described by Ordway, were: (1) The emphasis laid upon the mental and physical development of the child rather than upon the mere acquisition of skill in the use of the common tools. (2) The carefully arranged sequence of the exercises and the care taken to adapt them in other respects to the nature of the child. (3) The restriction of the work of the pupil to the making of complete articles, valuable for their usefulness or for their beauty. (4) The importance attached to the knife as being "the first and fundamental tool." (5) Insistence upon trained teachers as instructors.

In 1888 the Sloyd Training School was established in Boston under the patronage of Mrs. Quincy Shaw, who continued to support the institution up to the time of her death. The director was Gustaf Larsson, a former student under Salomon at Näas and the leading cham-

pion of the system in America. Within the last two or three years, the institution has been taken over temporarily by the Boston school system. This relationship may become permanent.

Defects in Sloyd

Sloyd has proven superior to the Russian system in its adaptation to the interests of school children. A recent writer says,[13] "It must be admitted that the most general form of handwork in all countries consists of sloyd woodwork adapted to meet local needs."

But sloyd in the form in which it was introduced from Sweden had defects of its own. Some attacked its employment of instruments of precision as tending to hinder the development of "the unconscious automatic power of grasping magnitudes and proportions so essential in elementary training during the period of growth."[14]

According to others, sloyd, notwithstanding the attention paid by some of its representatives to drawing and artistic design, was, like its predecessor, inadequate in its appeal to the æsthetic interests of the child.[15]

One chief obstacle to its success resembled that which has hampered the growth of the kindergarten, namely, a certain tendency toward rigidity of procedure, a pedantic formality based upon the assumption that there were profound psychological and other reasons for the minute observance of the prescriptions of the founders as to the

[13] *Training in the Arts and Handicrafts* (London, 1922), p 63

[14] J. L. Tadd, *New Methods in Education* (New York, 1899), p. 28.

[15] *Cf.* Report of National Education Association Committee on Exhibition, 1888.

character and the sequence of the exercises. This fault, however, has of late years been largely overcome. A spirit of freedom has been introduced, initiative and originality are encouraged, and, owing to the better adaptation of the work to the tastes and abilities of the pupils, it is pursued with greater zest.[16]

The Art Movement in Industrial Education

Another noteworthy attempt at a solution of the problem of the utilization of hand training in the general education of the young is that of Charles Leland and his associates, in the last two decades of the nineteenth century. Leland, influenced apparently by the work of Morris and his followers, emphasized the importance of art work in contributing to the general culture of the individual. Moreover, he considered it a phase of industrial life peculiarly adapted to the child's nature.

> The universal truth that man develops the ornamental during the infancy of the race before the useful, is illustrated in every individual. The child who cannot as yet make a shoe or file metals or master a trade, can, however, learn to design decorative outside patterns, mould beautiful pottery, set mosaics, carve panels, work sheet leather and repoussé or embossed sheet brass.[17]

The experimental school established by Leland about 1880 proved so successful that it was incorporated in the Philadelphia public school system during the following year.

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[16] This is nowhere better illustrated than in the work of Larsson's successor, Mr. Josef Sandberg, Director of the Boston Training School for Teachers of Mechanic Arts.

[17] Charles Leland, United States Bureau of Education, "Circular of Information," No. 4, 1882.

The system of manual and industrial art training thus inaugurated in the Philadelphia Public School of Industrial Art has owed its subsequent development largely to J. Liberty Tadd, chief instructor in the institution since its inception, and Leland's successor as director since 1884.

A characteristic of the system is the intimate and effective correlation of hand training with art and nature study, and the importance attached to these as part of the general education of the young.

> The young, of whatever circumstance in life, have a right to the joy that comes from knowing and perceiving beauty in nature and in art forms. . . . The mind can be expanded, elevated, even in the lowest stages of society. This is done by art methods rightly directed and by æsthetic culture, especially that which concerns itself with the expression and embodiment of beauty in form, which has so important an effect on the organism.[18]

The more elementary stages of the course are devoted to the cultivation of general dexterity of hand and accuracy of eye. To this end courses in drawing, designing, modeling, and wood carving are carried on simultaneously. Mechanical drafting, constructive work in wood or iron are restricted to the more advanced grades.

> When pupils have acquired a certain dexterity of hand and accuracy of eye and are able to draw, model, and carve reasonably well, then it is of advantage for them to attempt constructive work and mechanical drawing. They should then be about fourteen years of age.[19]

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[18] Tadd, *op. cit*

[19] *Ibid.*, p. 305.

No use is made of steam power or machinery. "The deficiencies of machine-shop practice for the purposes of educating hand and eye, as well as brain, are now generally recognized among progressive educators."[20]

The work of the Philadelphia Manual Training School has from the first been distinguished from that of its prototype at St. Louis by the attention paid to the artistic. Writing of the school in 1888, Superintendent Seaver of Boston says: "The first [feature] is the distinct emphasis placed on the æsthetic side of the work. Free-hand drawing, clay modeling, and wood carving are all coördinated with, and intimately related to, the successive stages of the shop work."

The æsthetic tendency has persisted throughout the opening years of the twentieth century. It is reflected in the large proportion of the papers devoted to the subject read at the meetings of the National Education Association, in the persistence of the Arts and Crafts movement,[21] and the tendency to organize associations for art and manual training teachers in common, such as the Eastern and Western Drawing (or Art) and Manual Training Associations, the Arts Crafters, and the Manual Arts Association. A speaker before the Chicago Manual Arts Association, in 1907, says, "The absorbing theme from the Atlantic to the Pacific is design or art in construction, and construction in art."

The movement, especially as represented in the work of J. Liberty Tadd, has spread to Europe. In 1896, Tadd was invited to explain his methods to members of

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[20] *Ibid.*, p. 309.

[21] *Cf.* articles on the Arts and Crafts movement in Public Schools in the *Chautauquan*, September, 1903, and May, 1904.

the British Association for the Advancement of Science. An institution employing his methods was founded at Liverpool. His system attracted the attention of educational authorities in Norway, Sweden, Switzerland, Belgium, France, and Germany.[22] It was reviewed at length in the *Revue Pedagogique.*[23] Tadd's work, *New Methods in Education,* was translated and published by the Hamburg Teachers' Association.[24]

The Increasing Application of the Principle of Manipulation to the Teaching of Other Subjects [25]

The psychological considerations which led educational reformers to urge the addition of manual training to the traditional school subjects led also to important, if not revolutionary, changes in the methods of teaching the subjects already on the program.

The importance of securing unity in school work by correlating the manual occupations with the more purely intellectual studies had long been recognized.[26] In the late eighties and early nineties, however, special attention began to be paid to the fact that the direct study of things, so much emphasized by the realists, implies manipulation and the exercise of the pupil's constructive ability. The acquisition of knowledge in many or in all

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[22] A. Panthier, *Enquête historique sur l'enseignement manuel* (Paris, 1906), pp. 154-155.

[23] *Revue Pédagogique* (1903), pp 120-132, 347-365

[24] J. L. Tadd, *Neue Wege zur kunstlerischen Erziehung der jugend* (Leipzig, 1900). *Cf.* Johannes Richter, *Die Entwicklung des kunsterzieherischen Gedankens* (Leipzig, 1909), pp. 185-186, 247.

[25] For information on this subject I am indebted largely to A. Panthier, *Enquête historique sur l'enseignement manuel dans les écoles non techniques* (Paris, 1906).

[26] *Cf.* the work of Froebel, Blasche, and others.

fields of elementary school work, it came to be seen, can be made more effective through the employment by the pupils of their hands. Hence fundamental changes in methods of teaching the sciences and even mathematics, history, and literature.

The change took place first in the field of the sciences. The futility of attempting to acquire a knowledge of these through the study of a textbook was first recognized in higher institutions of learning. In 1825 Liebig provided laboratory facilities for his students, which would enable them to make the more important gases and to analyze them quantitatively. An account of this work by Professor Will having been published in an English translation, the plan was adopted in various higher institutions in England. In 1868 it was tried out in the Manchester Grammar School. Normal courses on the experimental plan were organized in the South Kensington Institute in 1873. At about this time the method was coming into use in the teaching of science in America.[27]

A further step was taken when importance began to be attached to heuristic as distinguished from merely confirmatory or illustrative experimental work. A vigorous attack on dogmatic instruction was made by Professor Meiklejohn at the International Conference on Education in 1884. Similar attacks were made in later meetings by Professor Armstrong. Heuristic procedure in the sciences possessed, it was claimed, many of the advantages formerly considered peculiar to the special classes in handwork. Not only did it promote skill of

[27] See John Runkle, "Report on the Russian System," etc. (Boston, 1876).

hand, but it cultivated initiative and independence. Armstrong, indeed, goes so far as to declare that, "The end of experimental science is to afford boys and girls an opportunity of learning how to do things for themselves." The laboratory, Armstrong insisted, should always contain a workshop where "it will be possible to have a great deal of the apparatus made on the spot by the pupils themselves."[28] So much is Armstrong impressed by the manual training afforded by the experimental, heuristic plan, that he proposes that the name "workshop" be substituted for "laboratory."

The method gradually made its way down from higher to lower institutions. In 1891, it was introduced into the elementary schools of London. In 1896 the Syllabus published by the British Association of Headmasters advoeated the introduction of the method into secondary schools. The Report of the Department of Science and Art for 1899 likewise favors instruction by experiment.

In America, textbooks on science, like Spalding's *Botany,* or on the teaching of science, like Smith and Hall's work on the *Teaching of Chemistry and Physics,* follow the experimental plan. In this country, however, it is employed as a supplement, and not, as in England, as a substitute for the textbook and recitation method.

Analogous changes were at the same time taking place in drawing. The Prang system usurped the dominating position formerly held by the more or less Froebelian systems. For the childish and tiresome occupation and studies of abstract forms there was substituted

[28] H. E. Armstrong, *The Teaching of Scientific Method* (London, 1903), p. 465.

the direct study of nature, trees, clouds, flowers, the forms and movements of man and animals. For the formal exercises are substituted concrete, practical problems. "Make a cover for your book. Arrange the leaves, flowers, sticks, and tablets on your desk in a beautiful series. Fold the paper for a book cover. On the cover paint the series of objects as you have arranged them."

Similarly the tendency to utilize the manual activities of the young in instruction is traceable in recent methods in language, literature, and history.

In language study, objects are shown the children. They handle them and talk about them, tell stories, recount experiences. In literature, the content is frequently dramatized or is made the basis of work in drawing, modeling, construction, etc.

The history work concerns itself more than formerly with man's industrial achievements. In their manual work the pupils sometimes retrace the development of some of the more important industrial arts. The study of weaving, for instance, is sometimes made to serve as a center for the study of the history of civilization. Throughout the course in the elementary grades the children draw, model, paint, or construct the appurtenances of life characteristic, respectively, of the successive periods they are studying.

Mathematics, geometry, mechanics, and some branches of calculation lend themselves easily to the application of manual activity. Pupils acquire, for instance, a knowledge of the properties of mathematical figures through drawing, paper cutting, and construction. The application of the principle in the field of mathematics

seems to be a distinctive feature of modern French pedagogy.[29]

In brief, as the foregoing illustrations show, an outstanding feature of the more recent development of methods of teaching the various subjects of the school program is the increased employment of manual activity on the part of the pupil.

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[29] A. Panthier, *Enquête historique sur l'enseignement manuel*, p. 180.

CHAPTER XII

THE DEVELOPMENT OF VOCATIONAL INDUSTRIAL EDUCATION

Summary.—Although advocates of school handwork have always urged its value as an aid in selecting and preparing for a vocation, it was chiefly its reputed cultural value which led, in the last quarter of the nineteenth century, to its general introduction. The incorporation of manual training into the school program was urged, primarily, because of its value as one of the liberal arts; considerations of vocational training were secondary.

The first decade of the twentieth century is characterized by a reaction against this view. The Massachusetts state commissions on industrial education, the National Education Association Committee on Industrial Education, and other organizations urge a reorganization of manual training courses so as to make them more directly contributory to vocational ends. They recommend, also, further provision for vocational education in special schools and classes. In this movement the employing class take a prominent part.

Among the conditions contributing to the movement were the growth of compulsory education legislation, dissatisfaction with the results of the manual training work in the schools, the continued transfer of manufacture from the home and shop to the factory, the depletion of the national stock of raw materials, the demand by the laboring class of a better adjustment of school work to their needs, and an increasing lack of confidence in the doctrine of formal discipline.

Among the more successful and influential of the pioneer vocational schools were those established for Negro and Indian students at Hampton, Virginia, and Carlisle, Pennsylvania.

The earlier important vocational industrial schools for white students were founded by private individuals and date from the early eighties. The earliest public schools of this class date from the first decade of the twentieth century.

While the history of the Russian system, the development of the sloyd movement, and the rise of the "New Education" indicate, in the latter part of the nineteenth century, a growing tendency to employ school handwork for purposes of cultural education, the first decade of the twentieth century is marked by what seems at first to be a decided reaction, namely, a demand for greater attention to vocational ends in manual education. The conflict between the two tendencies is, however, more apparent than real. For while the sloyd system and the "New Education," at least, were promoted largely in the interests of children well within the age of compulsory school attendance, the latter movement was supported, for the most part, in the interests of pupils who were within two or three years of leaving school.

While handwork seems to be gradually securing for itself recognition as an indispensable feature of an all-round cultural education for younger children, it is coming to be recognized, also, that the school work of those who are to leave school in their early teens should contribute to their vocational preparation. As a recent writer puts it:

> The problem no longer takes the form: should the handwork course aim at a wide and general training, or at a specific preparation for some kind of industrial pursuit; but rather, at what stage in the pupil's career should the former aim be superseded by the latter?[1]

[1] *Training in Art and Handicrafts* (anonymous), p. 64.

It is the purpose of this chapter to trace the twentieth century movement for vocational school handwork.

Agencies Influential in Promoting the Movement

Practically all movements for the introduction of hand training into school education have found support in the belief that such training contributes to the vocational preparation of those who are to enter industrial pursuits. Woodward and Runkle, however, as well as other leaders of the great movement which actually carried hand training into the schools of this country, were often emphatic in subordinating its vocational to its cultural value. Manual training, they were never weary of repeating, aims, primarily, not at teaching a trade, but at the all-round development of mind and body. Woodward, in 1885, declared:[2]

> The object of the introduction of manual training is not to make mechanics. I have said that many times, and I find continued need of repeating the statement. . . . Our great object is educational; other objects are secondary. That industrial results will surely follow, I have not the least doubt, but they will take care of themselves.

With the opening of the twentieth century, however, there is manifested a tendency to emphasize the importance of vocational education as an end in school handwork.

The leaders of the æsthetic or industrial art movement, Leland and Tadd, had already, during the preceding decade or two, been directing attention to the vocational

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[2] Address before the Philadelphia Social Science Association, December 11, 1885, p. 16. *Cf.* John Runkle, "Report on Industrial Education," p. 3.

and economic value of the training which their system afforded. The former noted with pride that the boys and girls in his class in wood carving were each capable of earning eight or nine dollars a week.[3] The latter insisted on the value of the training in drawing, molding, wood carving, and the like, as a preparation for any handicraft. The boy, he claimed, who had had this true manual training, "will learn a trade and become a better workman in it in a few months than the ordinary apprentice would in several years."[4] However, what seems to have been by far the most influential agency in inaugurating a definite movement for vocational education in both general and special schools was the Massachusetts Commission on Industrial and Technical Education, appointed in 1905, to "investigate the needs for education in the different grades of skill and responsibility in the various industries of the Commonwealth."[5] Its report, issued the following year, contains an admirable review of the conditions giving rise to the vocational movement.

Prominent among these was the fact that neither the growth nor the results of manual training had proven satisfactory.

The wide indifference to manual training as a school subject may be due to the narrow view which has prevailed among its chief advocates. It has been urged as a cultural subject mainly useful as a stimulus to other forms of intellectual

[3] Charles Leland, *Practical Education* (London, 1889), p. 9. *Cf.* Address before the Philadelphia Social Science Association, 1880, pp. 4-5.

[4] J. L. Tadd, *New Methods in Education* (New York, 1899), p. 31.

[5] Massachusetts Legislature, Resolves of 1905, Ch. 94.

effort,—a sort of mustard relish, an appetizer,—to be conducted without reference to any industrial end. It has been severed from real life as completely as have the other school activities.[6]

An additional factor in the trend toward vocational education was the fact that changes in methods of manufacture, the decay of apprenticeship increasing commercial competition—local and international—and the progressive usurpation of the child's time by the school; these and other conditions were leading both manufacturers and wage-earners to advocate school education in the industries "because of a personal need." At the same time

students of social phenomena . . . who have been brought into intimate contact with the harder side of life . . . think they see in some form of industrial education a means of securing earlier and greater efficiency as wage-earners. . . . Broader-minded students of education . . . are coming more and more to feel that education is more than schooling of the old-fashioned type; and that for the fullest development of a child he must early and continuously be regarded as a member of the whole community, must be familiar with all its activities, giving as well as receiving, producing as well as consuming, doing as well as learning.

Besides these more general considerations, the Commission finds a further reason for providing for a more or less vocational school training in the industries in the fact that

the lack of skilled workmen is in many industries making the process of manufacture difficult and expensive. . . . This

[6] "Report of Massachusetts Commission on Industrial and Technical Education," Columbia University, Teachers College Educational Reprints, No. 1, p. 14.

lack is not chiefly a want of manual dexterity, though such a want is common, but a want of what might be called industrial intelligence . . . mental power to see beyond the task which occupies the hands for the moment to the operations which have preceded and to those which will follow it. . . .

Manufacturers believe that a system of industrial education wisely planned would tend to develop such intelligence while it increased technical skill.

A further consideration, and one to which the Commission was, perhaps, the first to direct general attention, was the large number of boys and girls who, after completing the period of compulsory school attendance at fourteen, and before being admitted to industrial apprenticeship at the minimum age of sixteen, become permanently fixed in some "blind alley" occupation. A careful investigation, conducted by the Commission's Subcommittee on the Relation of Children to the Industries, led to the conclusion that

sixty-eight per cent of the children who commence work between fourteen and sixteen are subjected to the evil influences of these unskilled industries or are in mills. They have wasted the years as far as industrial development is concerned, and in many cases they have forfeited the chance ever to secure it, because of lack of education.

To meet these conditions, the Commission recommended provision both through the existing public school system and through independent public schools for industrial education directly available for vocational purposes. In the former, it recommended provision for instruction and practice in the elements of productive industry, including agriculture and the mechanic and

domestic arts. It recommended, further, that towns and cities be permitted to

> provide independent industrial schools for instruction in the principles of agriculture and the domestic and mechanic arts, also evening courses for persons already employed in trades, and . . . instruction in part-time classes of children between the ages of fourteen and eighteen years who may be employed during the remainder of the day.

The report recommended, further, the appointment of a commission on industrial education to be

> charged with the duty of extending the investigation of methods of industrial training and of local needs and to . . . advise and aid in the independent schools . . . as well as to . . . initiate and superintend the establishment and maintenance of industrial schools for boys and girls in various centers of the state with the coöperation and consent of the municipality involved.

The bill drawn up by the Commission, embodying the above recommendations, was passed with some slight modifications by the Legislature in 1906.

The work of the Commission attracted immediate and widespread attention. Its report, according to that of its successor, issued within a year, had "already had distinct influence in arousing similar movements in other states; for example, in New York and Rhode Island."[7]

The trend of educational thought toward vocational

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[7] Report of Massachusetts Commission on Industrial Education, March, 1907, p. 13. Report of Indiana Commission on Industrial and Agricultural Education, 1917, p. 8 "Since the famous Douglas commission investigated the subject in Massachusetts in 1905, such states as Wisconsin, New Jersey, Maine, Maryland, Michigan, Illinois, as well as Massachusetts, have authorized and carried out investigations."

school education is clearly reflected in the report of the National Education Association Committee on the Place of the Industries in Public Education, appointed in 1907.

Its report, presented in 1910, expresses, as did that of the Massachusetts Commission, dissatisfaction with the progress of manual training. After deploring the fact that "in the field of elementary education . . . the continuous and, at times, strenuous discussion of thirty years has not produced results commensurate with the importance attributed to manual training by its advocates," and that "in the field of secondary education there is even greater discrepancy between the promise of theory and the reality of practice," it proceeds to assert that "in intermediate schools, industrial occupations are an important element in the wide range of experience necessary for the proper testing of children's aptitudes as a basis for subsequent choice of specific pursuits either in vocations or in higher schools," and that "in secondary schools, industrial occupations properly furnish the central and dominant factor in the education of those pupils who make final choice of an industrial vocation." [8]

Handwork, the Committee insists, has a mission in secondary education other than that of general culture. It must furnish a large proportion of the pupils some definite preparation for earning a livelihood. In the smaller cities, something may be accomplished toward this end by reorganizing the manual training courses, making them more definitely vocational in character.

[8] Report of Committee on the Place of Industries in Public Education, 1910, pp. 4-6.

"It may be entirely possible . . . to modify slowly manual training courses . . . transferring the prevailing cultural purpose into the industrial without any real loss of culture."[9] Where practicable, however, a special type of vocational industrial high school should be established. The Technical High School of Cleveland comes nearer than any other to exemplifying what the Committee has in mind.[10] For "the rank and file of the great army of industrial workers," trade schools are recommended with admission requirements some years lower than those of the industrial high school.

The extremely difficult problems involved in such a vocationalization of public school work are frankly stated, and some valuable suggestions are given toward their solution.

As is shown in some of the extracts quoted above, another important factor in the movement for vocational school training has been the influence of the usually wealthy and powerful class of industrial employers. Facing, as they do, the keen competition in the markets of those countries which have made more adequate provision for vocational industrial training, and keenly realizing the difficulty of securing an adequate supply of skilled labor, they have, as a rule, vigorously supported the movement for the school training of the young in the industries.

The influence of Massachusetts leaders of commerce and industry, in bringing about, through legislative enactment, the introduction in 1870 of industrial draw-

[9] *Ibid*, p. 99.

[10] The other so-called "technical high schools" of the country, the Committee finds, "do not radically differ from the ordinary manual training schools." *Ibid.*, p. 104.

ing into the public school, has already been noted. Another illustration of the interest taken by industrial and commercial leaders in promoting vocational industrial education is to be found in the circular letter sent to the different state legislatures in 1877 by the National Board of Trade.[11] The Massachusetts Commission, in its report of 1906, states that:

> The Commission was told at almost every hearing that in many industries the processes of manufacture and construction are made more difficult and more expensive by a lack of skilled workmen. . . . Manufacturers confidently believe that a system of industrial education wisely planned would tend to develop . . . [industrial] intelligence, while it increased technical skill.

Further illustrations might be derived from the programs of the meetings of the National Association of Manufacturers of the United States. In 1907, the Association's Committee on Industrial Education presented a report devoted, mainly, to the discussion of the necessity for trade schools and the attitude of the labor unions toward them. Two years later, the Committee reports that "officers and managers of the principal industrial and trade schools through the country . . . agree with us that a much higher grade mechanic can be graduated from a trade school than can be produced through the apprenticeship system in the old way."

The report for 1911 agrees with that of the Massachusetts Commission in considering the years from fourteen to sixteen as the critical period so far as industrial education is concerned.

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[11] Reprinted in Rhode Island House of Representatives Report of Committee on Education, January, 1877, pp. 15-16.

> The working people of the country . . . know . . . that if their children stay in school until sixteen, they will have passed the psychological time when industry beckons—will have acquired other tastes and will never enter the industries. . . . Therefore, as good citizens and as employers, it is for us to give special consideration to the educational problem as it concerns children of fourteen to sixteen.

The attitude of the employer class toward the question of industrial education and the reasons for it are well set forth by Van Cleave, President of the National Association of Manufacturers and a leader in the National Association for the Promotion of Industrial Education, in an address before the latter body in 1908. Discussing the means of meeting the demands of the present for industrial education, he says:

> Attach a manual training department to every public primary school in the United States. Give an hour a day to the use of tools . . . and make this compulsory. . . . Have free industrial high schools open night and day to the boys who have taken the manual training course in the primary schools, and from these high schools the boys would, after a two or three years' course, graduate as first-class mechanics.

Provision of this sort, he contended, must be made

> if we intend to adequately utilize our advantages in physical resources, meet the fierce competition which is put up for us by Germany, France, and other countries in which industrial education is general, and win and hold the first place in the struggle for the command of the world's markets.[12]

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[12] The support given to the movement for vocational trade schools by capitalists has served, in some measure, to array the labor class against it. The Massachusetts Commission, for instance, "early became aware that its purpose and work encountered the suspicion and hostility of many of the labor unions of the State. . . . It was suspected that the Commission was cre-

Another influential factor in promoting vocational school education in the industries has been the National Society for the Promotion of Industrial Education, organized in 1906 "to unite the many forces making toward industrial education the country over." By "industrial education" is meant "that schooling which deals with training of direct vocational value to the industrial worker." The first object of the society as mentioned in its constitution is "to bring to public attention the importance of industrial education as a factor in the industrial development of the United States." Its membership includes the leading manufacturers, educators, social workers, as well as the most eminent representatives of other callings who are especially interested in the cause of industrial education. Through its annual meetings and its publication of the results of investigations and surveys, it has contributed much to the trend of thought and practice in the field of vocational school education in the industries. In 1910 it passed resolutions urging upon Congress the making of an appropria-

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ated to formulate a plan for trade schools supported at public expense The opposition to such schools is based on the fear that they would furnish workmen in numbers sufficiently large to affect the labor market, and bring about a lowering of wages"—Columbia University, Teachers College Educational Reprints, No. 1, p. 6.

A like attitude is sometimes taken by educators. For instance, one writing in the *Manual Training Magazine* (1914, p 351) says, "Manual training is often introduced into our schools to furnish manufacturers a supply of labor which is at least partially trained. . . . I have some suspicion that manual training of this character is so strongly advocated by some of our manufacturing friends because they believe . . . a reduction of wages 'a consummation devoutly to be wished.'" *Cf.* Leavitt, *Examples of Industrial Education*, pp. 28-30.

tion to enable the Bureau of Education to develop schools for industrial training.

Conditions Contributing to the Movement for Vocational Industrial Training

The persistent trend of theory and practice toward vocational school handwork was due to a variety of causes, some of which have been incidentally referred to.

Prominent among these was the growing realization of the failure of the Russian system so widely adopted during the last three decades of the nineteenth century. It became more and more evident that if handwork were to retain its place in the general school program, it must possess more definite and tangible ends than those of merely formal discipline.

At the same time, a change in the character of the children in attendance at school was felt by some to necessitate the substitution of practical and vocational for cultural ends in school work. The growth of legislation for compulsory school attendance and its more rigid enforcement had brought into the higher elementary grades, and even into the high school, a somewhat larger proportion of those fitted neither by their native capacities, nor by home and social influence, for the pursuit of literary and scientific studies. Hence a demand for school exercises more directly preparatory for manual occupations.

Changes in the conditions of home life supplied an additional argument for vocational work in the school. The continued transfer of manufacture from the home to the factory and the continued flow of population from

rural to urban districts tended more and more to reduce the value to the child of his domestic experiences as an aid either in the selection of, or in preparation for, an industrial vocation. Compensation for this loss, it was felt, must be found in the school in the practice, not of merely formal tool exercises, but of actual vocational occupations.

Meanwhile, the restriction of opportunities of entering a skilled trade through the door of apprenticeship seemed to be more and more keenly felt. This restriction was due both to the increased difficulty of providing for apprenticeship training in the highly organized factory systems and to the tendency on the part of trade unions to limit the number of apprentices. Both the laborers and the employers who felt the pressure of this restriction turned naturally to the school for relief.

Again, it has been pointed out that, while the source of skilled workmanship seemed to be reduced, the demand for it increased even relatively to the growth of population. One explanation of this is to be found in the fact that as our stocks of raw materials were depleted we were compelled to rely more and more upon skilled craftsmanship as the element of value in our exports.

Still another factor was the growth of the democratic spirit. This manifested itself in a demand on the part of the laboring classes for a better adaptation of general school education to their vocational needs and for an extension, through part-time or evening schools, of educational opportunities to those who are under the necessity of earning a living.

While thus social, economic, and other conditions were

fostering the vocational movement, certain currents in psychological and educational thought were bringing students of education to assume a more favorable attitude toward it. The doctrine of formal discipline on which the system of manual training had been based had fallen into discredit with many people. At the same time there was a marked tendency to estimate the worth of school instruction more and more exclusively in terms of conduct and action. Increased attention was paid also to the study of individual differences and to the utilization of the results of this in determining the future occupation of the child.

Pioneer Schools for Vocational Industrial Training

Vocational Industrial Schools Established During the First Half of the Nineteenth Century.—Sporadic examples of trade or industrial schools, such as the Gardiner Lyceum or the Rensselaer School, occur as early as the twenties of the nineteenth century. Most of these seem to have died out or to have developed into higher technical schools. Some of the evening schools established in connection with Mechanics' Institutes have developed into modern industrial, art, or trade schools and survive in such institutions as the Ohio Mechanics' Institute of Cincinnati and the Maryland Institute for the Promotion of the Mechanic Arts.

Vocational Schools for the Education of the Negro and the Indian.—One condition contributing to the vocational education movement was the eminent success with which it had been carried out in schools established for the education of the Negro soon after the close of the Civil War. The Massachusetts Commission says:

Broader-minded students of education . . . see that this sort of [vocational, industrial, school] training . . . is being used to elevate the colored race in the South; and they ask why it may not be equally efficient in improving the social conditions of white as well as black children.

Writing in 1915, Booker T. Washington, himself a pupil of General Armstrong, the founder of Hampton Institute, the first of the great vocational schools for the Negro, says: —

At the present time there is almost no Southern state that is not putting forth efforts in the direction of securing industrial education for its white boys and girls, and in most cases it is easy to trace the history of these efforts back to General Armstrong.[13]

Among the most formidable of the conditions resulting from the Civil War was the existence, closely intermingled with the white population of this country, of millions of emancipated Negro slaves, heavily handicapped under the burden of the habits of their former condition, lacking the knowledge, the experience, the worthy ideals and ambitions which alone could render them capable of the right performance of their duties as free members of a democracy.

The amelioration of the condition of this race through school education, in the industries, as well as in the liberal arts and sciences, constitutes one of the most inspiring chapters in our educational history.

The great pioneers in the work of elevating the condition of the Negro race in this country saw clearly, as Pestalozzi had seen, that the intellectual and moral

[13] Booker T. Washington, *Up from Slavery* (1915), p. 166.

enlightenment of a submerged class must be based upon, must indeed be an outgrowth of, their economic efficiency. It was this principle which guided the efforts of General S. C. Armstrong in organizing, in 1868, for the education of the Negro, the Hampton Normal and Agricultural Institute, an institution which has been characterized as "the first industrial school of any importance in the United States."

The son of a missionary in Hawaii, he had early become familiar with the plan of employing industrial education as a means of training primitive peoples for the duties and responsibilities of civilized life.[14] Educated under Mark Hopkins at Williams in the spirit of magnanimous service, he had become especially interested, as colonel of a colored regiment during the Civil War, in the problem of the education of the Negro, and had worked out a definition of its aims and of the means to be employed.

> The thing to be done was clear: to train selected negro youth who should go out and teach and lead their people, first by example, by getting land and homes; to give them not a dollar that they could earn for themselves; to teach respect for labor, to replace stupid drudgery with skilled hands; and, to these ends, to build up an industrial system, for the sake not only of self-support and intelligent labor, but also for the sake of character.[15]

That the mastery by the Negro of the various forms of skilled labor would contribute powerfully, both to the

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[14] *Cf. School Life* (Washington, D. C.), September 1, 1920, pp. 14-15.

[15] S. C. Armstrong, *Twenty-two Years' Work of the Hampton Normal and Agricultural Institute* (Hampton, Virginia, 1893).

development of his character and the improvement of his social status, had long since been recognized.[16] It is Armstrong's achievement that he was the first to make it possible for large numbers of negro youth to acquire in school industrial skill, economic efficiency, along with the elements of a liberal education.

Hampton Institute was incorporated as an independent institution in 1870, and was assigned one-third of the funds accruing to the state from the provisions of the Land Grant Act. Aiming to provide an elementary and secondary education to students of extremely limited means, and, at the same time, to foster in them the spirit of independence, the institution embodies certain of the characteristics of the manual labor school. While most of the subjects of the ordinary program in the arts and sciences are taught, especial attention is given to training in the industries. These fall into three classes: (1) those introduced primarily to provide students with means of self-support; (2) those designed to accomplish this end and also to teach a trade; and (3) those maintained exclusively for purposes of vocational education.

The success of Hampton Institute in realizing its aims led to the establishment of numerous similar institutions. One of these, the Tuskegee State Normal and Industrial Institute, founded in 1870 by the Alabama legislature and placed under the direction of Booker T. Washington,

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[16] Frederick Douglass urged the acquisition of skill in the handicrafts as a means of elevating his race. In 1848 he said, in an address to a convention of Negroes in Cleveland, "Try to get your sons into mechanical trades. Press them into the blacksmith shop, the machine shop, the joiner's shop . . . Every colored mechanic is, by virtue of circumstances, an elevator of his race." Holland, *Frederick Douglass* (New York, 1895), p. 175.

a pupil of General Armstrong, has had an even more remarkable growth than the parent institution at Hampton.

The vocational school training which had proven so successful in the education of the Negro was soon extended to that of the Indian. In 1878, seventeen young prisoners of war, taken in fights with the Indians, were admitted to Hampton Institute. Later some fifty others were admitted, and an Indian department was organized. During the following year an Indian school supported by the federal government was opened at Carlisle, Pennsylvania. One-half of each day was devoted to shop and farm work, the remaining half to regular school studies. Under the outing system, the students were placed out among farmers and others during vacation, where they not only earned money to defray part of their school expenses, but acquired further practical knowledge of agriculture and the industries.

In 1884 the Haskell Institute was opened near Lawrence, Kansas. Here all students, except those in the special normal, commercial, and kindergarten departments, divide their time between the regular academic studies and the study and practice of some form of industry. Housekeeping, farming, carpentering, blacksmithing, masonry and plastering, steam fitting and engineering, wheelwrighting, painting, harness making, tailoring, shoemaking, and baking are taught and practiced.

Similar instruction and training are given in other Indian schools, with the result that, notwithstanding the formidable obstacles presented by Indian customs and traditions,

the busy farmer, the thrifty housewife, the skillful artisan, the careful tradesman, are no longer rare. . . . So great, indeed, has been the gain already achieved, that in many instances where twenty years ago Indian savagery ruled supreme, it would be difficult now to find any of its features . . . clearly manifest.[17]

The Earlier of the Trade Schools Established for White Students Since the Civil War.—While thus school training in the various branches of industry was being developed for the Negro, attempts were made here and there to provide school instruction and training in the trades for white youth. One of the earliest and most successful of these was the founding of the New York Trade School, in 1881, by Colonel Richard T. Auchmuty. The founder's purpose was to supply a better means of instruction and training in the handicrafts than that afforded by the declining apprenticeship system. Tuition fees were charged, but the institution was neither established nor maintained for financial profit. Its entire resources, since greatly augmented through additional private endowments, are devoted exclusively to the one end—efficient school instruction and training in the trades.

In 1885, the Rochester Mechanics' Institute was established by private subscription to provide vocational industrial training along with the elements of a liberal education. During the following year a day school was established.

The number of schools of this sort, giving practical industrial training, rapidly increased during the fol-

[17] W N. Hailmann, *Education of the Indian*; Butler, *Education in the United States* (1910), p. 963.

lowing decades. The vocational movement of the opening twentieth century is reflected not only in the establishment of important privately endowed schools, such as the David Ranken, Jr., School of Mechanical Trades in St. Louis in 1907, and the Wentworth Institute in Boston in 1911,[18] but also in the establishment of public institutions, for example, the Philadelphia Trades School in 1906, the Milwaukee Schools of Trades in 1906-1907, and the Columbus Trades School in 1909. The same period is marked by the organization of state systems of industrial schools or of aid to such schools, such as that of Massachusetts in 1906-1909, New York in 1908, and Connecticut in 1909.

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[18] Incorporated 1904.

CHAPTER XIII

OTHER FEATURES OF THE MORE RECENT DEVELOPMENT OF SCHOOL EDUCATION IN THE INDUSTRIES

Summary.—Notwithstanding the steady increase throughout the twentieth century of schools and classes for manual and industrial education, there is still confusion of opinion as to its purpose.

Nevertheless, progress is made in the development of the theory of industrial education, in defining the extent and character of the school's participation in the task of vocational preparation and in the development of government support.

A leading writer on educational theory, John Dewey, centers the work of the elementary school about the manual occupations. Dean Russell and others lead in a reaction against excessive reliance upon handwork as a means of cultural education. They recommend the systematic study of the great fundamental branches of industry, employing school handwork only as auxiliary. School handwork, during the period, tends to become more closely adjusted to the industrial occupations.

In vocational education there is a growing tendency to resort to some combination of school and shop work as the best means of providing efficient instruction and practical training.

Government recognition and support for vocational industrial education has been secured in most of the states. A new era is inaugurated through the passing of the Smith-Hughes Law granting federal aid in support of grades of vocational instruction and training in the industries, suited to the needs of the industrial workers of the country.

The extension of provision for manual training and industrial education in the schools during the first two decades of the twentieth century was not accompanied by any marked unification of opinion as to its purpose. The chaotic variety of opinion noted by the specialist of the Bureau of Education in the eighties [1] still prevailed. It was, indeed, frequently a subject of comment in the press and on the platform.[2]

Amidst this confusion of opinion and of practice, however, certain progressive movements deserving of especial notice assert themselves. In the first place, certain noteworthy contributions are made to the theory

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[1] See above, pp. 176-177. Even the founders of the first Manual Training High School were at variance as to the purpose of the distinctive feature of its curriculum. *Cf.* p. 162.

[2] To cite a few examples: At the 1910 meeting of the National Education Association, a dean of a college of engineering said: "We ought to get an accurate definition of what we are trying to do. If the manual training high schools are trying to solve the problem of industrial education, they ought to say so; and if the work is cultural, they ought to say so." *Addresses and Proceedings of the National Education Association* (1910), p 736.

Similarly, Professor David Snedden, in address before the Boston Manual Training Club in 1913: "Much of the restlessness to-day prevalent with regard to manual training is obviously due to the fact that, in the last analysis, we are only guessing as to where we are going with it. We do not know just what purpose is to be achieved."—*Manual Training Magazine*, 1913, p. 371.

Mr. F. E. Cardullo, in an article published the following year, writes: "One of the unsolved problems in educational work is the purpose of manual training."—*Manual Training Magazine* (1914), p. 351.

Mr. M. M. Proffitt, Specialist in Industrial Education, United States Bureau of Education, in an address before the Department of Vocational Education of the National Education Association: "With regard to the objectives for industrial courses other than those of the strictly vocational type, much confusion exists. . . . There is a great need for a clarification of aims."—*Addresses and Proceedings of the National Education Association* (1925), p. 907.

of industrial school education. Secondly, progress is made in the determination of the part that the school can profitably take in the vocational education of the young for the trades and industries. Thirdly, there is an important, if not epoch-making, development of governmental support.

Contributions to the Theory of Industrial Education

Handwork in the Dewey System of Elementary Education.—One of the most carefully worked out and one of the most widely influential of the more recent systems of industrial education is a product of the studies and experiments which mark the organization of the Elementary School of the University of Chicago, at the close of the nineteenth century, under the direction of John Dewey and his associates.

Dewey's investigation of the problem of the adaptation of the aims, means, and methods of common school education to present day conditions led him to conclusions strikingly similar to those of Heusinger, Froebel, Ruskin,[3] and other earlier reformers as to the importance of industrial occupations as activities contributory to moral and cultural development, in brief, to all-round social efficiency.

The profound changes taking place in the industrial organization of society, Dewey observes, call for corresponding changes in the character of common school education. The Industrial Revolution, by shifting the field of manufacturing activity from the home to the factory, makes it incumbent on the school to provide that play for the creative impulses which the home can

[3] See pp. 98*ff.*, 101*ff.*, 71*ff.*

no longer supply.[4] Furthermore, the school must now afford that knowledge of the industrial world and, in particular, of the fundamental processes which the child formerly could and did acquire through direct observation in the home and in the vicinity.[5] This is all the more desirable since, the manufacturing processes having become more technical and scientific, the systematic study of them will possess greater educational value. This value can be realized, however, only in the school and not in the factory.[6]

Dewey, like Heusinger, bases the claims of the industrial occupations to an important place in the school program upon psychological grounds. The child's knowledge originates and develops in connection with his doing. Industrial occupations gratify his native tendencies to explore, to manipulate tools and materials, to construct.[7] They reduce the gap between life in school and out. They make possible that coöperative activity so essential to the social education of the child. They afford motives for acquiring valuable information concerning a large variety of materials and processes. They constitute an avenue of approach to the study of the social and natural sciences.[8] Modern industrial procedure, utilizing as it does the latest scientific discoveries, affords an intellectual culture not inferior to that derived from the traditional school studies. Furthermore, to place the study of the industrial occupations in

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[4] John Dewey, *School and Society* (Chicago, 1900), pp. 21-26.

[5] *Ibid.* *Cf.* K. E. Dopp, *The Place of Industries in Elementary Education* (Chicago, 1905), pp 4-5.

[6] John Dewey, *Democracy and Education* (New York, 1916), p. 367.

[7] *Ibid.*, p. 288.

[8] *Cf.* the views of Rousseau and Basedow, pp. 50, 54.

the common school program tends to bring intellectual culture within the reach of the masses. This subject, moreover, affords a correlating medium for the other subjects. It affords also motives for the study of these which the child can appreciate.

For the younger children, Dewey and his coworkers selected carpentry, cooking, sewing, and weaving, partly because they represent "some of the most important activities of the everyday outside world," and partly because they involve "different kinds of skill and demand different types of intellectual attitude."

The Industrialization of Manual Training.—The change in manual training, from a series of formal exercises in the use of tools to handwork more directly contributory to a knowledge of, and to skill in, the industrial occupations, has been noted in the preceding chapter as a feature of the vocational trend in industrial education.[9]

The Movement for the Objective Study of the Industries.—One of the most interesting and suggestive of the reform movements in the field of cultural industrial education marks a reaction against the tendency to exalt the importance of hand training *per se*. It proposes to subordinate mere manual training to the study of the industries and denies to the former the educational value hitherto generally ascribed to it. Reviewing the earlier history of industrial education in connection with a presentation of this point of view, Dean Russell says:

[9] As an illustration of this change it may be noted that the Indianapolis Vocational Survey Commission, in 1917, "strongly recommend that certain manual training centers . . . be designated as prevocational centers . . . to give instruction to classes in at least four lines."—Report, I, p. 158.

Some got the notion at first that there was a magical charm in the training of hand and eye. Manual training was heralded as the remedy for all defects of vision, mental and physical, and the claim was made that in whittling paper-knives out of wood the boy was really shaping his own character. Until within ten years, manual training was defended by its over-zealous advocates on the grounds of its values as a mental and moral discipline. It is difficult for us to see, even after the lapse of so few years, why so great worth was imputed to manual dexterity and so little value attached to good reading or legible writing or correct translation.[10]

Though the movement rejects the claims of handwork to a place of primary importance in cultural education, it recognizes the need of providing for the industrial education of the young. This is to consist, however, of an objective study of the industries and is to aim at a general survey of the industrial life of to-day. Handwork will be employed only for purposes of illustration and æsthetic training. There are to be no special courses in "manual training." Such training will be incidental only to the study of the industries, just as it is to other studies such as writing, drawing, reading, or arithmetic.

To secure in the vast range of industrial activities a definite, practicable, and comprehensive field of work, it is proposed to select the five or six industrial materials of most fundamental importance. The essential processes in the successive stages of production, manufacture, and distribution are to constitute the subject matter of the course.

A beginning in the application of these ideas in practice was made in 1910 in the Speyer School attached to

[10] *Educational Review*, New York, December, 1909.

Teachers College. A definite course of study was published in the Speyer School Curriculum in 1913.

One advantage claimed for the subject as thus defined is the extent to which it may be correlated with geography, arithmetic, drawing, and other subjects, and the consequent vitalizing influence it may exert on these.

A detailed plan of procedure based on this conception of industrial education was published by Dr. Percival Cole in 1914.[11] He proposes the division of the work into three distinct parts—instruction, observation, and manual action.

> Instruction will begin with the description and history of industries conducted near the school, and will extend to all the great national industries. . . . Observation will involve excursions to farm, factories, or government works in the neighborhood. Manual work will be necessary in order to prepare for instruction and to fix its results, and will also serve to illustrate objects and implements that have been observed.[12]

A still later stage of the development of this conception of industrial education is represented in a work by Professors F. G. Bonser and L. C. Mossman of Teachers College entitled *Industrial Arts for Elementary Schools*. The authors state that the organization of the work on

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[11] Percival Cole, *Industrial Education in the Elementary School* (Boston, 1914). For an example of the application of some of these ideas in actual practice see United States Bureau of Education Bulletin No. 25, 1918.—"Industrial Education in Wilmington, Delaware," p. 83.

[12] *Ibid*, pp. 43-44. *Cf* F. G. Bonser, "New Types of Industrial Work in Schools," *Teachers College Record*, May 1, 1915, and Alanson H Edgerton, *Industrial Arts and Pre-Vocational Education* (Milwaukee, 1922), p. 24.

the basis of the five dominant industrial materials (foods, textiles, woods, metals, clays and other earth material) had been found to be artificial and arbitrary and had proven difficult of application in actual practice.[13] They propose as a substitute the organization of the subject matter on the basis of the use of products in kinds of service—food, clothing, shelter, utensils, records for transmitting experience, and tools and machines.

In this recent move in the field of cultural industrial education history is repeating itself. As reference to the preceding pages will show, the objective study of the industries which it proposes was advocated by Rabelais in the sixteenth, by Comenius in the seventeenth, and by Basedow in the eighteenth century.[14]

Progress in Determining the Part to be Played by the School in Vocational Education in the Industries

The earliest American reformers in the field of vocational industrial education sought to provide in the school, supplemented by its school shops, a complete substitute for the slow and uncertain apprenticeship system.

Pioneer Trade Schools and the Difficulties They Encountered.—President Runkle of the Massachusetts Institute of Technology sought to relieve his students of the necessity of undergoing a course of apprenticeship by seeking out an exclusively school system of hand training. Finding what he sought in the Russian system, he installed it in the Institute in 1876.[15] In 1881, Colonel

[13] F. G. Bonser and L. C. Mossman, *Industrial Arts for Elementary Schools* (New York, 1923), pp. 25-26.

[14] See pp. 8, 15, 53.

[15] The utilization of this system (manual training) as a means

Richard Auchmuty founded the New York Trade School to equip young men with the mastery of a trade, through the agency of the school exclusively, and at the lowest possible expense of time and money. Within the next ten or fifteen years a number of similar institutions were established, such as the Technical Department of Pratt Institute, 1887; the Baron de Hirsch Trade School, 1891; the Williamson Free School of Mechanical Trades, 1888; the California School of Mechanical Arts, 1895; and the Wilmerding School of Industrial Arts, 1897.

These schools were all established through private benefactions. The list has since been greatly increased. About the middle of the second decade, trade schools were established as parts of public school systems, in Philadelphia in 1906, in Milwaukee in 1907, and in Columbus, Buffalo, and New York, in 1909.

A noteworthy feature of the educational history of the last few decades has been the spread of the conviction that the trade school, while a valuable auxiliary, can never meet all the conditions presented by the problem of the vocational education of the industrial workers of the country.

The equipment of an efficient trade school was frequently expensive, yet, as the students came largely from the poorer classes, little support could be secured from tuition fees. In some instances, as in the New York Trade School, endowments had enabled the school to give instruction below cost. The mere reduction or even the entire abolition of fees failed to make the schools accessible to the majority of those for whom they were

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of cultural education in secondary schools was only an afterthought. See pp. 158-160.

intended. The trades are recruited from classes too poor to provide support for youth old enough to learn a trade. In a few instances, as in the case of Girard College[16] and of the Williamson Free School of the Mechanical Trades, the Gordian knot of the problem of maintenance was solved by the munificence of the endowment, which provided board, lodging, clothing, school books, and utensils as well as tuition.

Endowments of this sort, rare and exceptional as they were, served, nevertheless, to direct attention to the importance of provision for the maintenance of the learner in institutions for the vocational education of the industrial classes.

Another difficulty was that of determining the trades to be taught. Public trade schools were confronted, on one hand, with the impossibility of providing training for all industries, and, on the other, by the injustice to individuals and to trades of using public funds to provide training in certain manual occupations and not in others.

Again, public and private trade schools alike found it difficult, if not impossible, to reproduce the conditions of regular shop or factory work.

The disposal of the manufactured product was another difficult problem. Where courses were planned solely in the interests of efficient training and instruction, much of the output was likely to prove unsalable and the expense correspondingly high. Where the output was designed to meet a popular demand, its manufacture failed to afford the variety of training necessary.[17]

[16] Trade instruction was introduced into Girard College in 1900.

[17] For an excellent account of the difficulties involved in voca-

The resultant of numerous attempts to overcome these and other difficulties was a general tendency, on the part of the school proper, to abandon the attempt to provide complete practical training and to restrict its activities for the most part to theoretical instruction. For the cultivation of craft or trade skill recourse was had to a more or less modified form of apprenticeship.

This tendency was further promoted by the progressive application of the principle of the division of labor in the manufacturing process. The labor of the individual workman was coming to consist, less and less, of the performance of all the successive processes necessary to the production of a single article, and more and more of the repetition of some one of these processes. The ease with which these elementary processes could be mastered and the short time required, made it possible for the workman to learn several and to shift from one industry to another. This brought about important changes in the kind of vocational education required. Some, like Arthur Pound,[18] held that no practical training was any longer needed outside of that which could be picked up in a few weeks in the factory. Others insisted on the necessity of the participation of the school, but pointed out that what was needed was no longer the mastery of a complete trade, but rather brief training in a variety of elementary manufacturing processes. A speaker before the National Education Association, in 1923, described the situation as follows:

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tional industrial school training see P. H Douglas, *American Apprenticeship and Industrial Education.*

[18] Arthur Pound, *The Iron Man* (Boston, 1922), p. 202.

"Few of our youth may profitably be specifically trained as apprentices in the whole of relatively few trades. The majority of our youth should probably be trained as interchangeable parts in the industrial scheme; trained for elasticity of adjustment." [19]

During the period under consideration there was growing recognition of the fact that the plan which could best provide this kind of training, and which would at the same time afford the most satisfactory solution of the difficulties above mentioned, was the combination of the school with the shop or factory in some kind of part-time education.

This combination of school instruction with shop or factory training has been brought about in a variety of ways. Of these, four have risen into prominence during the last quarter century as institutions for vocational education in the industries, the apprenticeship or corporation school, the cooperative school, the continuation school, and the evening school.

Apprenticeship Schools.—The apprenticeship or corporation school is maintained by the employing corporation to afford employees more or less systematic instruction, designed to fit them for the more efficient performance of their duties. The initiative in the establishment of such schools was taken as early as 1872 by the R. Hoe Company of New York. A similar plan was adopted at about the same time in the shops of the New York Central Railroad. A dearth of skilled labor led to the reorganization and careful systematization of the schools in 1905. In 1913 the National Association of Corpora-

[19] R. O. Small, *Addresses and Proceedings of the National Education Association* (1923), p. 499.

tion Schools was organized. During the last seven years the membership of the Association has increased from 37 to 146.

Closely related to this is the provision for vocational education made by associations of employers. In 1922 no less than twenty-five of such associations were organizing systems for training employees.[20]

The Cooperative School.—The coöperative school is one whose students become for a limited period the employees of a coöperating industrial corporation in order to secure the requisite practical training. An essential feature of the coöperative plan is that alternate periods, frequently of one week, are spent by the students in an industrial plant and in a school. The plan and the school cooperate, but are otherwise independent of each other.

The coöperative plan, like the manual training movement, had its origin in this country in a school of engineering and represented an attempt to solve the problem of providing students with a training sufficiently practical to enable them, upon graduation, to enter directly upon the full practice of their profession without having to complete a further period of apprenticeship.

The plan was conceived by Professor Herman Schneider, of the University of Cincinnati, and was put into practice by that institution and certain industrial corporations of the same city in 1906. The students were

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[20] C. A. Prosser, *Vocational Education Magazine*, September, 1922, editorial: quoted in *United States Bureau of Education Bulletin*, No 28, 1923, p. 14.

Cf C. A. Prosser and Charles R. Allen, *Vocational Education in a Democracy* (New York, 1925), p. 389.

divided into two sections, so that shop work was carried on by one section while the other was at school.

A trial of three or four years demonstrated the practicability of the plan. By 1912, coöperative courses had been organized in from twenty to thirty cities. In 1913 it was incorporated into the public school system of New York City.

It soon became evident that the plan afforded only a partial solution of the problems of vocational school education. Only a partial correlation of shop work with school work can be brought about where the character of the former is necessarily determined by business considerations. Moreover, dependent as the plan was upon voluntary coöperation, it soon revealed a lack of stability and permanence. This dependence upon the will of the manufacturer contributed also to arouse the opposition of union labor. It was attacked as being essentially undemocratic. A report on the plan by the American Federation of Labor asserted that:

> Any scheme of education which depends for its carrying out on a private group, subject to no public control, leaves unsolved the fundamental democratic problem of giving the boys of the country an equal opportunity and the citizens the power to criticize and reform their educational machinery.

The introduction of the plan into the high school at Fitchburg, Massachusetts, in 1908, attracted general attention. Various modifications of the plan were tried out at Beverly, Massachusetts; York, Pennsylvania; Little Rock, Arkansas; and elsewhere.

The Continuation School.—The second decade was marked also by the rapidly increasing use of the continuation school as a means of solving the problem of

industrial vocational education. This was due largely to a remarkable demonstration in Munich, Germany, of the efficiency of a well-organized school of this type as a factor in a system of vocational training.

The work of Dr. Kerschensteiner, the leader in the development of the Munich system of continuation schools, began to attract general attention in this country during the first decade. The Massachusetts Commission on Industrial Education issued a number of bulletins on the subject and gave a somewhat detailed description of the plan in its report of 1908. In 1910 Dr. Kerschensteiner was invited to this country by the National Society for the Promotion of Industrial Education and delivered, under its auspices, a number of addresses on the subject.

An essential feature of the plan was the establishment of a number of special continuation schools adapted to the peculiar needs of each of the important industries in the city. These included schools for carpenters, bakers, coopers, lithographers, plumbers, saddlers, and glaziers. By 1910 forty-six trades had been provided for. Apprentices were required to attend for nine hours a week. As school work closed by seven, there was only moderate encroachment on recreation and leisure hours.

The apparent success of this plan in Germany and its adaptability to the needs of this country gave a great impetus to the employment of continuation schools in industrial education. The plan proved to be one of the most important contributions yet made toward a solution of the problem of vocational school education. Recognition of this fact was shown in the legislative support it received.

Ohio led the way, in 1910, in a law permitting local boards of education to make attendance at a continuation school compulsory for employed children fifteen or sixteen years of age. Within two or three years, similar legislation was passed in New York, Indiana, and Massachusetts. Wisconsin, in 1911, and Pennsylvania, in 1913, passed laws which, under certain conditions, made attendance at a continuation school compulsory for employed children from fourteen to sixteen years of age. The federal Smith-Hughes Law of 1917 (to be described later) has led to legislation making attendance at continuation schools compulsory in no less than seventeen additional states.[21]

Evening Schools.—Parallel with this development of the so-called part-time schools was that of the evening school.[22]

This type of school was among the first in this country to give vocational instruction in the industries and to correlate this with the regular shop work of the student. The Franklin Institution of Philadelphia organized evening classes in architectural and mechanical drawing, in 1824. Its example was followed by the Ohio Mechanics' Institute, in 1828. In 1870 Massachusetts made it obligatory for towns of 10,000 and over to provide free instruction in mechanical and industrial drawing, either in day or evening schools, for persons over fifteen years of age.

The revival of these schools during the last two decades as centers of vocational industrial education has been

[21] P. H. Douglas, *American Apprenticeship and Industrial Education* (New York, 1921), pp. 252-268.

[22] Sixth Annual Report, Federal Board for Vocational Education (Washington, 1922), p. 45.

accompanied by attempts to remedy some of the most serious of their defects. The Cleveland Survey, for instance, recommended that they should be taught, not by teachers already fatigued by their work in the day school, but by a special corps of teachers devoting their time exclusively to part-time and to evening school work.[23]

The Tendency Toward Part-Time School Education.—As stated above, the industrial education of the last two decades has been characterized by the development of the four types of schools last mentioned, especially the continuation school.[24] The feature common to these is that they leave the practical training to be acquired in the shop or factory. In this way they avoid the most formidable of the difficulties confronting systematic vocational education in the industries. The problem of maintenance is solved through enabling the student to earn wages. Training is provided under actual working conditions; the tasks performed are not mere formal exercises, but are a part of the actual manufacturing process. No heavy expense is incurred to provide the latest equipment merely for instructional purposes. Finally, the plan involves no disturbance of economic conditions.

The Development of Governmental Support

Commissions on Industrial Education.—A significant indication of the growth of the movement for industrial education has been the appointment of governmental

[23] Cleveland Education Survey, "Wage Earning and Education," pp. 80-81.

[24] Sixth Annual Report, Federal Board for Vocational Education, p. 46. See also Seventh Annual Report, p. 56.

commissions in different states to investigate the need for industrial education and the best means of satisfying it.

The earliest of these commissions was that created by the legislature of Connecticut, in 1903. Its report led to the passage, in 1907, of "An Act Concerning the Establishment of Free Public Schools for Instruction in the Principles and Practices of Trades."

Of the numerous later state commissions, probably the most influential was the Massachusetts Commission on Industrial and Technical Education, appointed in 1905. The reports of this Commission and its successor, the Commission on Industrial Education, appointed in 1906, exerted, as shown above,[25] a wide and profound influence upon the theory and practice of school education in the industries.

Similar work was carried on by committees appointed by commercial, educational, and other associations, such as the American Federation of Labor, the National Association of Manufacturers, the National Education Association, and the National Society for the Promotion of Industrial Education.[26]

State Provision for School Education in the Industries.—Guided by the reports of investigating commissions and committees, public and private, and urged on by what seemed to be an increasing popular demand for industrial and vocational education, the legislatures of the different states made provision for its encouragement, direction, and support in a variety of ways which it would be impracticable to examine in detail.

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[25] P. 202

[26] Since 1917 The National Society for Vocational Education.

Federal Aid for Vocational School Training for the Industries.—Various considerations, however, led the advocates of vocational school training to look more and more to federal aid as essential to a satisfactory solution of the problem.

Both states and local communities felt themselves, in many instances, already burdened with the demands of general education. Again, the laboring classes were found to move about so freely that it seemed inequitable to impose the burden of their training wholly upon the state and local districts. Moreover, the federal government had long since, both in the Morrill Act of 1862 and in subsequent legislation, recognized its obligation to promote industrial and agricultural, as well as general, education. Indeed the vocational school education of the young, from fourteen to eighteen, might well be considered an unfulfilled obligation of the national government, for, while the popular agitation preceding the Act of 1862 aimed at the practical vocational education of the rank and file of the people, the resulting legislation had actually provided only for the higher technical, agricultural, and general education of the few.

An active campaign for securing federal aid led, in 1914, to the appointment by Act of Congress of the Commission on National Aid to Vocational Education. The Commission reported, in the same year, in favor of federal support of vocational education in the form of appropriations to the states to be applied toward the training of vocational teachers and toward the payment of their salaries. Its recommendations were embodied in the Smith-Hughes Bill, which became law in 1917.

The act provided for annual appropriations, increas-

ing by stated increments from five hundred thousand to three million dollars a year, to aid the states in paying the salaries of directors, supervisors, and teachers of schools and classes giving instruction in the trades and industries. A like provision was made for agriculture. For the training of teachers for these vocations, an annual appropriation increasing in four years from five hundred thousand to one million dollars was made. Only those states were to receive aid which duplicated the amount received. Not more than twenty per cent of the money appropriated for trade and industrial instruction might be expended for salaries of teachers of home economics.

The growing recognition of the superior efficiency of systems which combine school with actual shop experience is reflected in the provision that:

> At least one-third of the sum appropriated to any state for the salaries of teachers of trade, home economics and industrial subjects shall, if expended, be applied to part-time schools or classes for workers over fourteen years of age who have entered upon employment.

Furthermore, while the work of the all-day and the evening schools receiving support under the act is restricted to vocational instruction supplemental to the regular employment of the student, the part-time schools may teach "any subject given to enlarge the civic or vocational intelligence of . . . workers over fourteen or less than eighteen years of age."

That the benefits of the vocational school education supported by the act shall accrue to the rank and file of the manual labor classes, to the many and not to the few, is assured by the provision that the work is to be below

college grade and for pupils above fourteen years of age.

The Smith-Hughes Act has been, perhaps, the largest factor in determining the character of the more recent growth in the field of industrial school education. The Directory of Trade Schools, issued by the Federal Board for Vocational Education in May, 1925, shows that in 1924 over 700 day-unit trade courses and more than 210 part-time trade courses were given in the schools of the United States. The enrollment in part-time schools has increased from 53,000, in 1918, to 228,000, in 1922. While there has been a similar increase in the enrollment in manual training courses in public and private high schools—an increase from 137,318, in 1915, to 230,813, in 1922, the ratio of manual training to total enrollment has slightly declined, it being 10.64 per cent, in 1915, and 9.88 per cent, in 1922.

Meanwhile, the total of manual and industrial training and trade schools as listed in Patterson's *American Educational Directory* has increased from 328, in 1917, to 351, in 1925.

Vocational Guidance

In the twentieth as in the seventeenth [27] century, the problem of school training for the industries has brought with it that of vocational guidance. The children of the poor, if they are to receive vocational school training, must receive it early and hence need expert guidance in the selection of a suitable vocation. Moreover, the continued growth of the process of the division of labor has so increased the number of occupations as to make the matter of selection more difficult than formerly.

[27] See the proposals of Comenius and of Petty, pp. 15-16 and 26.

The movement for scientific vocational guidance seems to have been inaugurated in this country by Dr. Frank Parsons, in connection with his civic service work in Boston.[28] Introduced into the public schools of the city, it spread to those of other cities dealing with the problem of industrial education. It is significant that a marked development of interest in vocational guidance dates from about the close of the first decade, the period during which the reports of the Massachusetts commissions and of the National Education Association Committee on the Place of the Industries in Public Education [29] were attracting wide attention.

Vocational guidance, it was felt, had a twofold relation to school education in the industries. While, on the one hand, the attempt to provide industrial vocational training in the schools created an urgent need for vocational guidance, on the other, school instruction and practice in various industries aided the pupil to select the manual occupation best suited to his tastes and capacities.

The difficulties and dangers encountered have led to vigorous efforts to discover data that would afford reliable direction to those serving as vocational advisers. To this end noteworthy attempts have been made to devise tests and measurements that would reveal the tastes and capacities of an individual for a given type of work.[30]

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[28] Leake ascribes the origin to a group of New York school teachers. *Cf.* Albert H. Leake, *Industrial Education,* p. 155.

[29] See p. 203*ff.*

[30] *Cf.* H D. Kitson, *School Review,* 1916, pp. 207-214. A. H. Toops, "Tests for Vocational Guidance of Children Thirteen to Sixteen," *Contributions to Education,* Columbia University.

CHAPTER XIV

CONCLUSION; GENERAL REVIEW AND SUMMARY

About four hundred years ago, in attempts made by men fired with the spirit of the Renaissance to imagine and describe an ideally perfect manner of human life, the earliest suggestions were made that the study and practice of the industries be incorporated into the general education of the young. During the following century reformers, revolting against the empty word-study of the schools, and desirous of bringing the young, through education, into contact with the realities of life, constructed systems of education which provided through special schools or courses for instruction and training in various branches of industry. Toward the beginning of the eighteenth century the earliest attempts were made at the school instruction and training of the young in the industries.

The latter half of the same century sees the rise of two movements which have ever since proven to be two of the most powerful factors in bringing about manual and industrial school education, educational naturalism, and the Industrial Revolution. To these is to be added the movement for the relief of poverty which brings about at this time, especially in Bohemia and Germany, the introduction of industrial education not only into charitable institutions but also into the folk school.

Still another factor was the rise of the spirit of

democracy. It was mainly the influence of this which led Rousseau to give handwork so prominent a place in the educational program of his *Émile*. A new era of experiment in industrial education is opened by Rousseau's disciples, Basedow and Salzmann. Influenced largely by this movement, Pestalozzi attempts to elevate the condition of the poor through devising a system of education industrial, agricultural, domestic, and cultural, adapted to the social and economic conditions of the times and to the nature of the child.

At the turn of the eighteenth and nineteenth centuries, Heusinger, taking the naturalistic point of view, writes a monograph defending, on psychological principles, the thesis that handwork should be made the center of the school curriculum. In his *Familie Werthheim* he presents an elaborate description of a system of education constructed on this plan. At about the same time Blasche, in charge of educational handwork in Salzmann's school, publishes works on methods in industrial education and on the correlation of the manual occupations with the other school subjects.

A much larger measure of public attention was directed to the new theories of the educational importance of handwork, through the educational writings of Froebel, and through his example in introducing it into his famous school at Keilhau and elsewhere.

In the sixties, influenced largely by the writings of Pestalozzi and Froebel, Cygnaeus brings about the introduction of hand training into certain of the public schools in Finland, first into the normal school and then into the rural elementary schools.

Under the influence of the views of Cygnaeus, Froebel,

and others, the Swedish sloyd system, which had been developed to train the peasants in wood carving and other forms of handwork, is transformed into a system of cultural handwork.

Meanwhile a beginning had been made in the introduction of manual and industrial work into American schools. In 1870, at the request of manufacturers and merchants who felt the pressure of the international competition intensified by the Industrial Revolution, the legislature of Massachusetts introduced industrial drawing as a required study into the public elementary schools of the state. Some six years later, certain heads of schools of mechanical engineering found what they believed to be an efficient school method of instruction and training in the use of tools in the Russian system of manual training, exhibited at the Centennial Exposition at Philadelphia in 1876. They applied it immediately, not only in the vocational preparation of students of mechanical engineering, but in providing cultural hand training for students in secondary schools. The Manual Training High School, established by certain business men of St. Louis, under the direction of Professor Woodward, proves to be the first of a type of school characterized by the extensive use made of handwork as a means of general education. Schools and departments of schools affording similar training are established throughout the country.

At the same time the kindergarten movement in the East was in various ways developing into a movement for general industrial education in the higher grades of the common schools. The Industrial Education Association of New York City, successor to the Kitchen Garden

Association, established a training school for teachers of industrial education which, while retaining its keen interest in industrial education, developed into the Teachers College of Columbia University.

Attempts to remedy defects in the formal and abstract Russian system of manual training led, in some instances, to the adoption of sloyd, or of the Leland-Tadd art and nature system or the Arts and Crafts system, or to the incorporation of certain features of one or more of these into manual training school or department courses throughout the country.

About the middle of the first decade, the work of the Massachusetts commissions on technical and industrial education inaugurated a movement for the establishment of vocational industrial schools and for replacing the formal manual training exercises by handwork more directly related to the industries.

The demand for vocational school training was met by the establishment of trade schools and trade departments in general schools which aimed to give the pupil the complete mastery of a trade. Since the opening of the twentieth century, the view has gained acceptance that the mere trade school or department, though a valuable auxiliary, could never meet the requirements of a nation-wide system of vocational school education. The shop or manufacturing plant operating under normal conditions has come to be more widely recognized as an indispensable factor in such a system. Various combinations of the school and the shop for purposes of training have been devised. Of these the continuation school seems to have won the widest acceptance.

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